ENERGY AND WATER DEVELOPMENT APPROPRIATIONS FOR FISCAL YEAR 2009

WEDNESDAY, MARCH 5, 2008

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 9:30 a.m., in room SD–124, Dirksen Senate Office Building, Hon. Byron L. Dorgan (chairman) presiding.

Present: Senators Dorgan, Domenici, Craig, Bond, and Allard.

DEPARTMENT OF ENERGY

OFFICE OF NUCLEAR ENERGY

STATEMENT OF HON. DENNIS R. SPURGEON, ASSISTANT SECRETARY FOR NUCLEAR ENERGY

OPENING STATEMENT OF SENATOR BYRON L. DORGAN

Senator DORGAN. I'm going to call the hearing to order this morning. I thank all of you for being here. We're here to take testimony from officials at the Department of Energy on three program offices within the Department of Energy that oversee aspects of the Government's Energy, Research, Development, Demonstration, and Deployment Programs. I have great interest in these issues, and I look forward to hearing from the three witnesses today.

I want to mention that just this morning, starting at 8 o'clock until 9 o'clock, I have spent an hour on the subject of the continued use of our coal resources in this country related to the issue of global warming. So I've spent a fair amount of time this morning on this issue of coal and global warming. One of the keys of that, of course, is embodied in the budget requests and the research and development that are done in the fossil energy account. I'm going to ask Mr. Slutz about that today.

I do want to point out that with respect to the fossil energy account recommended by the President, a substantial portion of that increase in the fossil energy account is for the Strategic Petroleum Reserve. I want to make a comment about that in a moment.

We've been joined by Senator Domenici. I wanted to mention this is the first of a series of hearings that we will do with respect to the programs in the Department of Energy, and I wanted to recognize at the start of these hearings the long service of Senator Domenici. I'm not doing this early because I'm anxious for his re-

tirement, but the fact is this is his last year working on these accounts, and he's done that for a long, long period of time.

He's served on the Appropriations Committee since 1983 and been either a chairman or ranking member of this committee for the past 13 years, and he has been a real champion for a lot of issues, including energy issues. I just wanted to say to him that he's been a significant contributor to all of the work of this committee, and I'm pleased to have him as a ranking member. I recognize he will retire at the end of this year, but I did want to make a comment about that at the front end of the series of hearings we will have.

Last year and this year and in future years, we will work closely on these issues on both sides of the aisle. Senator Domenici and I worked closely last year to try to figure out how to put a bill together.

I do want to mention that last year, for example, in the Senate, we were $1.9 billion above the administration's request for this subcommittee. As you know, we had to cut back some of that because there was a $22 billion difference between the Congress and the President. We had to come down nearly the entire $22 billion on the domestic accounts, and it wasn't easy to do. But we did it and still tried to preserve what we could of the priorities.

I want to say that the requests for the three Department of Energy offices before us today are about $2.69 billion of the Department's $25 billion fiscal year 2009 request. The Department has asked for some increases for the Nuclear and the Fossil Energy Programs, and it has essentially asked for level funding for the Office of Electricity and Energy Reliability.

Let me come back to this issue of Strategic Petroleum Reserve. I'm a fan of the Strategic Petroleum Reserve, but I think there's a time to fill it and a time to pause. A substantial portion of the increase in fossil energy is for the Strategic Petroleum Reserve. A proposition of the DOE's request is to expand to 1½ billion barrels of oil in the SPR.

We are now on the current course at about 96.8–97 percent filled with the current goal in the Strategic Petroleum Reserve. I am very concerned that we are continuing to put oil underground when oil's trading at $103 a barrel. Taking oil from the Gulf of Mexico as a royalty in kind and now putting it underground takes oil out of the supply and puts upward pressure on gas prices.

I think it's exactly the wrong thing to do, and I have introduced legislation to try to stop that. My legislation would take a pause for only 1 year—a pause unless, during that period, oil comes back below $75 a barrel. The pause would then no longer be in effect. This fossil energy account is so important because it's where we're going to need to do our research for coal, carbon capture and so on.

In order to continue to use our coal resources, we need to invest a lot of money. This includes what used to be the Clean Coal Technology Program and other things. We need to invest a lot of money if we're going to continue to use our coal resources because the emission of carbon. We'll need to find a way to capture and sequester it, and I don't see enough money requested here, especially when we've got a third of a billion dollars off chasing this SPR thing right now and oil's at $100 a barrel.

I don't see enough money in this account being focused on what we should be dealing with in order to continue to use our coal resources. Coal contributes about half of all of the electricity that we use in this country. Even with the climate change legislation, we're going to continue to use coal. The question isn't whether; it's how. We're going to have to capture carbon, but we need to prove the technology through the demonstration and the commercial application of it. So, we're going to need more investments there, in my judgment.

Having said that, I want to just show three charts, and then I'm going to call on the ranking member, Senator Domenici, and then also Senator Bond.

The three charts I want to show are these. These are the four places we are now sticking oil underground, 60 to 70,000 barrels a day at the moment. It's going to go to at least 120,000 barrels a day in the second half of this year if the administration fills it to capacity. Those are the four locations. This second chart shows the 1½ billion barrel target.

I don't think we should fill SPR at any cost. I think we ought to take a pause at the moment. The third point in the final chart is: Does it make sense to be putting oil underground when you've got tanks aboveground that need more supply in order to put downward pressure on price? Reducing supply increases price. That's just a fact, and our Federal Government should not be doing that.

Senator Domenici and I were at a hearing yesterday, and the EIA indicated that it increases price. They estimate a nickel a gallon. I think it's probably more than that, but nonetheless this is a policy choice that we should address, and I hope to address it in the chairman's mark this year.

Having said all of that, I have some questions for the witnesses after they have testified, but I want to call on the ranking member, Senator Domenici.

OPENING STATEMENT OF SENATOR PETE V. DOMENICI

Senator DOMENICI. Well, first, Mr. Chairman, I want to thank you for your nice words, and you served with me on this subcommittee long enough to know how much it has been a part of my life, because I have used this subcommittee, as I see it, to foster nuclear—the development of nuclear power in the United States and to cause the renaissance that is occurring.

Much of the things we did came from this subcommittee, and some of the various people that worked on this subcommittee are nuclear experts out there in America promoting nuclear power.

Obviously I want to just generally state a few things and then put my statement in the record. First, the big issue remaining in the nuclear power itinerary is to move with as much dispatch as possible to get an American program started for reprocessing or recycling, whichever one calls it, the waste that comes out of our power plants. It's being done in Europe. The United States has let it pass us by, and let me say to my friend here on my left who's a proponent of getting things done in this area of energy it's almost incredible to me that we have put off recycling for such a long time.

The Secretary in front of us there, Secretary Spurgeon, he came here with the notion of getting on with this job in the nuclear area,

and I'm not sure that we have yet put the glass on this and said that here's how we're going to do it, because I'm not sure that everybody that has authority is moving in the same direction, and we've got to find out whether we're going to do that or not.

If we're not going to move in the same direction, I've got other things to do this year. If we are, then I'll work my hands till there's nothing left to see if I can't get in place an American program for recycling. It is ghastly that we're doing what we're doing, and I know you're working on this. We may have different ideas as to how the Government ought to go about doing it, but I just want everybody to know I'm not a fan of waiting around for GNEP and I don't think you are either. That's a giant—you call it an "umbrella." I don't know what it is, but, you know, it's too big, takes too long, it's going to do too many things that we can't wait for. And so under it or on top of it, we've got to use the authorities that came with the other program that we have ourselves put in the law, AFCI, which supersedes and takes the place of GNEP, and that we ought to see what AFCI, Alternative Fuel Cycle Initiative—is that it?

Mr. SPURGEON. Advanced Fuel Cycle Initiative.

Senator DOMENICI. Advanced Fuel. That's a very important concept and we funded it. We funded it—whenever we funded GNEP, we funded it, and we've got to see what you're doing with that today.

I want to also say I don't have time for a hearing like this to go through the details of the President's budget, but I would like to know how his budget stacks up for the funding of the laboratories now, this year versus where we ended up this year. I don't know if that's any of your business, but we'll ask the question and see that the Department answers it so that we know because we have our version of what it says.

I want to say to all of you, the three of you, you're doing a great job, all things considered. I want to say for everyone to hear that under the leadership of the current Secretary, Mr. Sam Bodman, this department has come into its own. It is a true, powerful department. It is one that I'm proud to say is the United States Department of Energy.

We walk in there and we know you're in an energy department. You're not in a department that won't talk about nuclear. You're there, nuclear is on the way. It's a department that considers all aspects of energy and does a great job with it. And you, sir, Mr. Spurgeon in particular, having taken the job late, left a good job to take it, you're doing terrific. Sorry you lost Clay Sell. I'm sure everybody is, but you've got to get on without him and for the next year get something done beyond study. Get something where some of these programs turn into action.

I yield now and thank the chairman very much.

Senator DORGAN. Senator Domenici, thank you very much. Senator Bond?

STATEMENT OF SENATOR CHRISTOPHER S. BOND

Senator BOND. Thank you very much, Mr. Chairman, for holding this hearing on the Department's budget, and I join with you very

strongly in saluting our distinguished ranking member for his years of farsighted leadership in the energy field.

I can tell you, Senator Domenici, your colleagues are very proud of your work. We're going to miss you. There's going to be a big hole to fill, but I think that you will leave us with a vision that you laid out today that will inspire us for the future.

Today, I'm here, Mr. Slutz, to express my profound dismay and disappointment over your Department's attempt to abandon the FutureGen Near-Zero-Emission Integrated Coal Power Plant by chopping up the program into three smaller projects focusing only on carbon capture and sequestration technology or CCS.

Energy's action on FutureGen calls into question the veracity of the Department's statements to Congress, the Department's reliability as a partner, the Department's credibility as an advocate, and the Department's judgment as an agency.

As we all know, President Bush announced FutureGen in 2003 as a public-private partnership to build a first-of-its-kind coal-fueled near-zero-emission power plant. FutureGen would provide a full-scale coal gasification technology, called IGCC that generates power and captures nearly all air pollution, working together with carbon capture technology that allows for carbon collection and sequestration.

This would be historic because IGCC is not yet proven affordable. Carbon capture and sequestration technology, called CCS, for power plants is not proven at all, and neither has been proven working together at a full-scale affordable and reliable facility.

FutureGen would enable researchers and engineers to demonstrate affordable clean coal technology, ensuring its reliability, compatibility, and solve production problems that arise only when technologies are tested working together and at full scale.

This is vital work because while we must do more with clean energy sources, specifically nuclear, including wind, solar, biomass, energy efficiency, each is expensive, some are controversial, and together they are overwhelmingly insufficient to meet our energy needs now and in the long-term future.

Entire regions of the country, such as my Midwest, the mountain west, and south, depend upon coal to meet our current energy needs. Abandoning coal would place far too much demand on replacement energy sources, raising energy prices even further, and threatening the products and jobs that depend upon affordable energy from coal.

FutureGen involves what many say is needed: an international partnership with governments, power producers, coal providers, and technology companies. FutureGen has that with 13 industrial partners doing business on six continents, including China. One of the best things that the administration has done for climate change questions is to develop the Asia-Pacific Partnership that will allow the transfer of our technology, once we demonstrate it, to India, to China, and to other countries.

What are we going to transfer if we haven't demonstrated it and don't know whether it works?

We all believe the Department when the Department of Energy said in 2004 that "FutureGen's integration of concepts and components are a key to providing technical and operational viability. In-

tegration issues between coal conversion systems, power systems, and carbon separation and sequestration systems can only be addressed by a large-scale integrated facility operation."

We all believed DOE when DOE issued a nearly 2,000-page environmental impact statement selecting DOE's preferred alternative to be providing financial assistance to the original FutureGen project. We all believed DOE when Secretary Bodman sent a letter this past November 30, supporting site selection by the end of the year. And now we all find it hard to believe that DOE has left FutureGen at the altar, choosing instead three younger cheaper women. Maybe that's not the best metaphor, because I support complementary efforts to develop CCS technology.

The Department's suggestion would be fine, if it were in addition to the integrated test plan, but the Department's reason for restructuring ring hollow. FutureGen's costs are the very reason we need Government help to work out technology barriers and get costs down.

The assertion that coal gasification is a proven technology obviating the need to fund a full power plant and its carbon collection system together is disproved by the Department's own statement I just read. It confirmed that testing the technology together at full scale is the only way to prove its affordability and reliability.

The future is in applying carbon capture and storage to IGCC plants, so we need an integrated plant to prove that future possible and affordable technologies can be implemented.

Mr. Chairman and ranking member, it's up to us to be strong leaders on clean coal technology. Others are not going to do it for us. Many would saddle us with massively expensive carbon reductions and will not care if clean coal technologies are not ready when those requirements kick in. We need more funding for clean coal technology and clean energy, and an additional few tens of millions of dollars here and there on these projects will not protect our families from the hundreds of billions, hundreds of billions of dollars in energy tax costs from carbon caps they would face under a cap-and-trade system.

If that is implemented before this is demonstrated, there is going to be devastation in many areas of the country and significant economic harm and harm to the environment. I urge the administration to return to the negotiating table and work out a revised FutureGen agreement at Mattoon. Industry is waiting in good faith for a good faith negotiating partner.

I also would urge this committee to expand its leadership role. We've already—you've already done wonderful work in support of clean energy and coal, but even greater efforts are needed. We must fund an expanded FutureGen and expanded clean coal technology. Our clean energy future depends upon it.

Senator DORGAN. Senator Bond, thank you very much. Senator Bond, I will be announcing a FutureGen hearing. We are working on setting a date for that hearing. I'm going to ask Secretary Bodman to come.

Obviously the administration has announced a decision. The decision, of course, is a fairly significant decision on a program that has been a much-heralded program, and I think it would be valuable for us to hear from the Secretary and from several other wit-

nesses. I'll be working on setting a date for that. I should be able to announce that very soon in terms of the date, but we will have a FutureGen hearing in the very near future.

Senator Craig.

STATEMENT OF SENATOR LARRY CRAIG

Senator CRAIG. Well, thank you, Mr. Chairman. I'll be brief. I simply cannot match the Senator from Missouri. That was absolute eloquence.

Senator BOND. Thank you.

Senator CRAIG. And I mean that most sincerely. I think all of us on this committee and certainly the authorizing committee recognized the critical necessity to get the technology behind coal and to move it. We simply must do that if we can continue to expect it to be what it ought to be.

But Dennis, to you, welcome to the committee, and I want to say at the outset how much I've enjoyed working with you over the last while, and I want to congratulate you on a job well done in reestablishing DOE's commitment to nuclear R&D, not unlike some of the thoughts that Senator Domenici has had.

The NE budget for 2009 is over $1 billion. I remember when a Secretary of Energy was quietly coming up to me and saying, I've lost my nuclear portfolio, it's down at the White House, and you can expect the budget to be zeroed out. And that wasn't long ago.

So, there's been a dramatic turnaround. Programs like NP 2010, to assist new reactor build, as well NGNP and, of course, we still clearly see the need for a global nuclear energy partnership with GNEP as we move this whole issue forward.

You've heard from me, you've heard from my colleague in the House, Mike Simpson say that we need to invest in our Nation's R&D infrastructure to support these programs as outlined in the National Academy of Science's report last year.

As the custodian of the INL, you know the state of the lab's infrastructure, and so I guess my message to you is let's fix it this year. I think that's tremendously important.

A couple of suggestions: Transfer the clean-up liability on the lab's side to the clean-up side, freeing up infrastructure funding; increase the annual budget request at the INL, infrastructure request from about $104 to $150 million a year. I think all of that would go a long ways toward assuring that lead nuclear lab the kind of facility it will need to meet the requirements the DOE will place on it in the future and that our Nation is going to place on it.

Mr. Kolevar, a job well done, enhancing the reliability and security of our Nation's electrical infrastructure and working with our lab in doing that. We have some excellent projects going on out there that, I think, because of the uniqueness of the lab and the way its campus is configurated and isolated, we've been able to offer some valuable expertise as relates to the grid, how we manage it against terrorist opportunity, I guess is one way of saying it.

Mr. Slutz, I'll not deal with—quite with the passion that Senator Bond has, but I think that both the chairman and I will discuss SPR and the inventory. Both Senator Dorgan and I believe that

there is another inventory that needs to be done besides simply filling up the salt domes, and that's a modern inventory of the OCS.

America needs to know its reserves and its resources, and they're currently being denied by those who are simply fearful, even though the technology of today would suggest that at appropriate times those reserves might well be necessary and reachable in an environmentally sound way.

Certainly in my remaining tenure here, I'm going to push that issue and push it very hard. I think it is wrong to deny our country that knowledge and we need to modernize that issue with the OCS.

Mr. Chairman, thank you much.

Senator DORGAN. Senator Craig, thank you very much.

The subcommittee has received a statement from Senator Cochran which we will insert into the record.

[The statement follows:]

PREPARED STATEMENT OF SENATOR THAD COCHRAN

Chairman Dorgan and Ranking Member Domenici, thank you for hosting this hearing today. I thank the representatives from the Department of Energy for being here this morning, as well.

Energy issues continue to dominate our Nation's agenda. It is the responsibility of all of us here to find ways to keep up with the world's ever-expanding electricity demands while at the same time increasing energy capacity and security here at home.

One way in which we can expand our power capacity is to expand the use of nuclear energy in America. I am pleased that the request for Nuclear Energy is increased from last year, and I hope we can fund these efforts at the highest level possible.

Additionally, it is crucial that we realize the important role fossil energy resources continue to play in meeting America's demands for energy. Our abundance of coal has always been the main source of power in our country, and it is crucial that we find new ways to make coal cleaner to use.

Finally, I would like to speak about the importance of the Strategic Petroleum Reserve in securing a stockpile of oil that might be tapped in case of emergency. I am pleased that Mississippi was chosen by the Department of Energy as the preferred location for expansion of the Reserve, and I hope that despite Chairman Dorgan's misgivings about filling the Reserve while oil prices are high, we might still fund the necessary infrastructure for expansion. As evidenced when fuel supplies were interrupted after Hurricane Katrina, the United States must have ample resources of oil should a disruption in supply occur again.

I appreciate each of you being here to present your budgets, and I look forward to hearing your testimonies. Thank you.

Senator DORGAN. We will now recognize our witnesses for statements.

Mr. Spurgeon, we're going to call on you first, and let me say that I've enjoyed working with you. I agree with Senator Domenici. You are a very solid advocate for the programs under your jurisdiction, and I thank you for being here. You may proceed.

Let me just say to all three of you, your complete formal statements are made a part of the permanent record, and we would ask that you summarize your remarks.

STATEMENT OF HON. DENNIS R. SPURGEON

Mr. SPURGEON. Thank you, Mr. Chairman. Chairman Dorgan, Ranking Member Domenici, and members of the subcommittee, it is a pleasure to be here today to discuss the fiscal year 2009 budget request for the Department of Energy's Office of Nuclear Energy.

Our Nation's strength and prosperity is built on our security and the availability of reliable sources of energy. A cornerstone to these goals of continued economic growth and a sustainable energy future is nuclear power.

The Office of Nuclear Energy's budget request supports the near-term expansion of safe, reliable, carbon-free nuclear power and the development of advanced nuclear technologies now and into the future.

It is significant to note that this administration has increased its funding request for nuclear energy every year, and in total, the fiscal year 2009 request represents a 330 percent increase in funding for nuclear energy since President Bush took office 7 years ago.

We can take some pride in this increase, but from a historical perspective, our total budget request for 2009 is less in absolute dollars than the resources we were devoting to nuclear energy the last time I served in government, more than 30 years ago in the Ford administration.

In constant dollars, today's budget is about one-third of the budget we prepared in 1976. In fiscal year 2009, a total of $1.4 billion is requested for nuclear energy activities, including $487 million for the Mixed Oxide Fuel Fabrication Facility.

I would now like to take just a moment to highlight our program areas and their corresponding budget requests. In fiscal year 2009, the President's budget requests $241.6 million for Nuclear Power 2010, to support industry cost-shared near-term technology development and regulatory demonstration activities focused on enabling an industry decision to build a new nuclear power plant by 2010.

To this end, the program will continue to support industry interactions with the Nuclear Regulatory Commission on new plant license applications as well as first-of-a-kind design finalization for standardized reactor designs.

The request also supports the issuance of conditional agreements for standby support in fiscal 2009.

This budget request also includes $301.5 million for the Advanced Fuel Cycle Initiative in support of the Global Nuclear Energy Partnership. In fiscal 2009, the request supports research and development on fuel cycle technologies that will support the economic and sustained production of nuclear energy while minimizing waste and satisfying requirements for a controlled, more proliferation-resistant nuclear materials management system.

The request also supports ongoing international activities to establish a framework for ensuring a reliable international fuel supply and the availability of grid-appropriate reactors.

Additionally, this budget requests $70 million for the Generation IV Program. This request supports critical research and development to achieve design goals that make the Next Generation nuclear plant licensable, sustainable, and economic. The Generation IV request also supports component and materials aging and degradation R&D that will provide the basis for supporting the extension of the current operating license period for existing nuclear reactors and will also enable the design of advanced reactor plants with longer operating lifespans.

A total of $16.6 million is requested for the Nuclear Hydrogen Initiative to support research and development on enabling technologies, nuclear-based hydrogen production technologies, and technologies that will apply heat from Generation IV nuclear energy systems to produce hydrogen.

Finally, $222 million is requested to maintain and operate the Department's unique nuclear facilities and infrastructure at Idaho National Laboratory, Los Alamos National Laboratory, and Oak Ridge National Laboratory. Included in the fiscal year 2009 requests under Other Defense Activities is $487 million for activities associated with the continued construction of the Mixed Oxide Fuel Fabrication Facility and $78 million for sitewide safeguards and security activities at the Idaho National Laboratory.

I would also like to note the fiscal year 2009 budget request continues our commitment to fostering the expansion of nuclear engineering programs at our universities. We have committed to designating 20 percent of funds appropriated to our R&D programs for work to be performed at universities at the level set forth in the President's budget. Twenty percent represents almost $77 million for this work.

PREPARED STATEMENT

Mr. Chairman, this concludes my opening statement. I would be pleased to answer any questions.

Thank you.

Senator DORGAN. Secretary Spurgeon, thank you very much for your testimony.

[The statement follows:]

PREPARED STATEMENT OF HON. DENNIS R. SPURGEON

Chairman Dorgan, Ranking Member Domenici, and members of the subcommittee, it is a pleasure to be here today to discuss the President's fiscal year 2009 budget request for the Department of Energy's (DOE) Office of Nuclear Energy.

Our Nation's strength and prosperity is built on our security and the availability of reliable sources of energy. The President's $25 billion fiscal year 2009 budget request for the Department aggressively addresses the growing demand for affordable, clean, and reliable energy and helps preserve our national security by working to further our energy security. A cornerstone to the goals of continued economic growth and a sustainable energy future is nuclear power. The Office of Nuclear Energy's budget request ambitiously supports the near-term expansion of safe, reliable and carbon-free nuclear power and the development of advanced nuclear technologies now and into the future. It is significant to note that this administration has increased its funding request for nuclear energy in every year, and in total, the fiscal year 2009 request represents a 330 percent increase in funding for nuclear energy since President Bush took office 7 years ago. In fiscal year 2009, a total of $1.4 billion is requested for nuclear energy activities including $487 million for the Mixed Oxide Fuel Fabrication Facility.

The President's commitment to nuclear power stems from its role as the only viable near-term option for producing significant amounts of emissions-free, baseload electricity. The expansion of nuclear power will play a key role in our decisions to find viable solutions to address the challenges posed by greenhouse gas emissions, climate change, and energy security while promoting a vibrant economy.

Today, 104 nuclear reactors generate nearly 20 percent of America's electricity and account for nearly 70 percent of electricity produced from non-emitting sources. Last month, the Nuclear Energy Institute reported that U.S. reactors produced 807 billion kilowatt hours of electricity in 2007—enough to power more than 72 million homes for a year. That total surpasses the previous record high of 788.5 billion kilowatt hours in 2004. However, for nuclear power to maintain its role in our energy

supply, it must grow. To sustain nuclear power's current 20 percent share, 40 to 45 new reactors must be built by 2030.

Worldwide, 31 countries operate 439 reactors totaling 372 GWe of electricity capacity. Thirty-four new nuclear power plants are under construction worldwide, and when completed, will add an additional 28 GWe of new electricity. This new construction is taking place or being considered in every major region in the world including Africa, Asia and the Indian subcontinent, Europe, the Middle East, South America, and North America.

We have recently seen projections that anticipate 55 total countries will operate 630 reactors totaling approximately 630 GWe by 2030. Potentially, a total of 86 countries could have nuclear reactors by 2050. Internationally, nuclear power is moving forward at a rapid pace with each month seemingly bringing new, significant announcements.

Nuclear power's ongoing expansion around the world requires us to address the used fuel and proliferation challenges that confront the global use of nuclear energy. To ensure that the United States plays a significant role in global nuclear energy policy, we must foster a robust domestic nuclear research and development program that maintains a cutting-edge nuclear technology infrastructure, and encourage international actions that support reliable nuclear fuel services as a viable option for countries that may otherwise consider the development and deployment of enrichment and reprocessing technologies. To meet these challenges, the President initiated the Global Nuclear Energy Partnership (GNEP). The domestic component of GNEP promotes the accelerated development and deployment of advanced fuel cycle technologies, while the international component encourages cooperation among States that share the common vision of the necessity of the expansion of nuclear energy for peaceful purposes worldwide in a safe and secure manner.

We have made marked progress in every one of our program areas, but much remains to be done. Our fiscal year 2009 budget request moves us in the right direction, allowing the Department and the Office of Nuclear Energy to take the lead in spurring the nuclear renaissance in the United States. I would now like to take the time to highlight our program areas and their corresponding budget requests.

NUCLEAR POWER 2010

A key component of our work and one of our most successful programs at the Department of Energy is the Nuclear Power 2010 program or NP 2010. This program was initiated by President Bush in 2002 and has produced significant results toward its goal of reducing the technical, regulatory, and institutional barriers to the deployment of new nuclear power plants. DOE and the President have increased our commitment to cross the finish line by nearly doubling its 2009 budget, calling on Congress to provide $241.6 million for NP 2010 to help ensure this important program can complete its work.

NP 2010 supports industry through cost-sharing near-term technology development and regulatory demonstration activities focused on enabling an industry decision to build a new nuclear plant by 2010.

Of the six Construction and Operation License (COL) applications that have been submitted to the Nuclear Regulatory Commission (NRC), five COL applications have been officially accepted for review by the NRC. And of these five, two applications—TVA's application for two Westinghouse AP1000 reactors at the Bellefonte site in Alabama, and Dominion Energy's application for a General Electric-Hitachi Economic Simplified Boiling Water Reactor at the North Anna site in Virginia—were developed through the NP 2010 cost-share program. In total, the NRC expects to receive 20 COL applications for 31 new reactors by 17 different utility companies. Of these 20 COL applications, 8 will reference either the Bellefonte or North Anna license applications. This simplification in the licensing process is expected to reduce the license application and review time these reference COLAs take by up to 50 percent.

Three early site permits have been approved for Exelon's Clinton site in Illinois, Entergy's Grand Gulf site in Mississippi, and the North Anna site, all a part of the NP 2010 cost share program, and a fourth ESP permit is pending. In addition, two new reactor design certifications have been approved by the NRC, the ABWR and the AP1000, and DOE is continuing with on-going first-of-a-kind design finalization activities for the standardized AP1000 and ESBWR designs, including: preparation of engineering analyses and calculations, design criteria documents, and total cost and schedule estimates necessary for an industry purchase of a new nuclear plant.

The NP 2010 program will continue to develop generic application preparation guidance for 15 COL applications expected in 2008 to help resolve regulatory issues that could potentially delay or derail NRC approval.

ADVANCED FUEL CYCLE INITIATIVE AND GNEP

President Bush announced the Global Nuclear Energy Partnership (GNEP) as part of his Advanced Energy Initiative in February 2006. The Advanced Fuel Cycle Initiative (AFCI) is the domestic technology development and deployment component of GNEP. The AFCI program aims to develop and demonstrate advanced fuel cycle technologies for recycling used reactor fuel to develop an integrated used fuel recycling plan, and support on-going research efforts with the goal of reducing the amount of material that needs disposal in a geologic repository and maximizing our use of energy resources.

In effort to further this important work, our budget request includes $301.5 million in fiscal year 2009 funding for AFCI. This request supports research and development activities that will advance the economic and sustained production of nuclear energy while reducing waste and satisfying requirements for a controlled nuclear materials management system that helps strengthen the nuclear nonproliferation regime. The request also supports on-going international activities to establish a framework for ensuring reliable international fuel services and the availability of grid-appropriate reactors, and the continued utilization of industry for schedule, cost, and technology developments for eventual recycling facility deployment.

Long-term goals of AFCI/GNEP include the partitioning of used fuel and recycling of long-lived radioactive isotopes for destruction through transmutation in liquid metal-cooled fast neutron spectrum reactors for actinide consumption and nuclear resource sustainability

AFCI/GNEP funding also provides support for a large number of universities involved in fuel cycle research and development, which both ensures that the United States has the intellectual capital needed to sustain our nuclear fuel cycle for the future and provides the important research needed for today's fuel cycle activities. Recycling used nuclear fuel rather than permanently disposing of it in a repository would result not only in utilizing more of the energy, but would also reduce the amount of high-level waste that needs disposal in a repository, thereby greatly enhancing the potential capacity of any geological repository. This increased efficiency in the fuel supply could ensure that even with the expansion of nuclear energy, the potential capacity of any geological repository would be greatly enhanced.

GENERATION IV

The Generation IV program is focused on very high temperature reactor technologies for use in a Next Generation Nuclear Power Plant (NGNP) to produce electricity, process heat, and hydrogen. Generation IV also is readying technologies that will further improve the economics and safety performance of existing Light-Water Reactor and advanced Generation IV reactor concepts.

The fiscal year 2009 budget request includes $70 million for the Generation IV program. The Energy Policy Act of 2005 (EPACT) authorized the Department to create a two-phased NGNP Project at the Idaho National Laboratory (INL). The Department is presently engaged in Phase I of the EPACT-defined scope of work, which includes: developing a licensing strategy, selecting and validating the appropriate hydrogen production technology, conducting enabling research and development for the reactor system, determining whether it is appropriate to combine electricity generation and hydrogen production in a single prototype nuclear reactor and plant, and establishing key design parameters. Phase I will continue until 2011, at which time the Department will evaluate the need for continuing into the design and construction activities called for in Phase II.

Additionally, this request supports component and material aging and degradation research and development that will provide the basis for extending the operating license period for existing nuclear reactors beyond 60 years, and will also enable the design of advanced reactor concept plants with longer operating life spans.

HYDROGEN INITIATIVE

Nuclear energy has the potential to produce large quantities of hydrogen efficiently without producing greenhouse gases and could play a significant role in hydrogen production for transportation and industrial sectors. Considerable progress in hydrogen combustion engines and fuel cells is bringing hydrogen-powered transportation close to reality. The goal of the Nuclear Hydrogen Initiative (NHI) is to demonstrate hydrogen production technology at increasingly larger scales through the use of nuclear energy that would be technically and economically suited for commercial deployment in concert with a nuclear power plant.

A total of $16.6 million has been requested for the NHI to continue hydrogen production systems operation and testing, evaluation of process improvements, and as-

sessment of long-term process stability, operability, and component durability. Furthermore, results from the integrated laboratory-scale experiments will be analyzed to identify cost drivers with an end goal of supporting a hydrogen technology selection by 2011.

NUCLEAR FACILITIES

The Department of Energy supports nuclear science and technology through one of the world's most comprehensive research infrastructures. The Office of Nuclear Energy has requested $222 million to maintain and operate infrastructure at Idaho National Laboratory (INL), Los Alamos National Laboratory (LANL), Brookhaven National Laboratory (BNL), and Oak Ridge National Laboratory (ORNL). A total of $104.7 million is dedicated to Idaho National Laboratory's facilities management. INL conducts science and technology research across a wide range of disciplines, INL's core missions include: development of advanced, next generation fuel cycle and reactor technologies; promotion of nuclear technology education, and applying technical skills to enhance our Nation's security.

Additionally, $38.7 million is requested to maintain a wide range of nuclear and radiological facilities and their associated infrastructures in an operational, safe, secure, and environmentally compliant manner at LANL, BNL, and ORNL. This infrastructure supports national priorities, including the provision of radioisotope power systems for national security uses and space exploration.

OTHER DEFENSE ACTIVITIES

Included in the Office of Nuclear Energy fiscal year 2009 request, under Other Defensive activities, is $487 million for activities associated with the continued construction of the Mixed Oxide Fuel Fabrication Facility and $78.8 million for site-wide safeguards and security activities at the Idaho National Laboratory to protect the assets and infrastructure from theft, diversion, sabotage, espionage, unauthorized access, compromise, and other hostile acts that may cause unacceptable adverse impacts on national security, program continuity, or the health and safety of employees, the public, or the environment.

UNIVERSITY FUNDING

Our fiscal year 2009 budget request continues our commitment to fostering the expansion of nuclear engineering programs at our universities and research institutions. Specifically, the budget request for the Office of Nuclear Energy explicitly states that we "will continue to support R&D activities at universities and research institutions through competitive awards focused on advancing nuclear energy technologies," and we have committed to "designate 20 percent of funds appropriated to its R&D programs for work to be performed at university and research institutions." These funds will support basic research and mission-specific applied R&D activities, as well as human capitol development activities, such as fellowships and infrastructure and equipment upgrades for university-based research reactors and laboratories. At the level set forth in the President's budget request for fiscal year 2009, 20 percent provides almost $77 million for this work. This commitment of 20 percent of appropriated funds will serve as a catalyst for success in achieving the objectives of the President's American Competitiveness Initiative and the America COMPETES Act.

This concludes my prepared statement. I would be pleased to answer any questions you may have.

Senator DORGAN. I want to recognize Secretary Kolevar. The Office of Electricity is an important office, and we appreciate the work you are doing. I was pleased to be the first person to announce your confirmation when you were in North Dakota for a meeting with a number of interests in August 2007, but thank you very much for your work, Mr. Secretary.

Why don't you proceed?

OFFICE OF ELECTRICITY DELIVERY AND ENERGY RELIABILITY

STATEMENT OF HON. KEVIN M. KOLEVAR, ASSISTANT SECRETARY FOR ELECTRICITY DELIVERY AND ENERGY RELIABILITY

Mr. KOLEVAR. Thank you, Mr. Chairman. Mr. Chairman and Ranking Member Domenici, members of the committee, thank you for the opportunity to testify on the President's fiscal year 2009 Budget Request for the Office of Electricity Delivery and Energy Reliability.

Our office's mission is to lead national efforts to modernize the electric delivery system, enhance the security and reliability of America's energy infrastructure, and facilitate recovery from disruptions to energy supply.

These functions are vital to the Department of Energy's strategic goal of protecting our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally responsible energy.

The President's budget requests $134 million for OE, a 17 percent increase from the fiscal year 2008 request. This includes $100.2 million for research and development activities, $14.1 million for operations and analysis activities, and $19.7 million for program direction.

Today, the availability of and access to electricity is something that can be easy to take for granted. And while more than a few people cannot describe what it is or where it comes from, electricity is vital to nearly every aspect of our lives, from powering our electronics and heating our homes to supporting transportation, finance, food, and water systems.

The Energy Information Administration has estimated that by the year 2030, U.S. electricity consumption will be almost 35 percent higher than it was in 2009. This indicates a growing economy but it also promises a significant amount of new demand on the electricity infrastructure, an infrastructure that is already stressed and aging. This means that we need to focus our attention on reliability.

Climate change is also affecting electric industry investments. Uncertainty in climate change legislation and policy is limiting investment in generation from fossil fuels, coal in particular, and is stimulating investment in renewables, such as wind. However, intermittent resources, such as renewables, require energy storage or other balancing technologies, advanced communications, and sophisticated modeling to maximize penetration without affecting the reliability and efficiency of our electric system.

OE's fiscal year 2009 budget request reflects a commitment to ensuring this reliability by supporting the research of breakthrough technologies, such as those associated with the Smart Grid and energy storage. With $5 million dedicated solely to Smart Grid development, a $6.6 million increase in the 2009 request for energy storage, and more than $88 million dedicated to other R&D work, the President's request reaffirms the effort to ensure increased reliability through research and development.

Modernizing the grid through technical innovation, however, represents just one side of the effort needed to tackle electricity reliability problems. Building the elaborate network of wires and other

facilities needed to deliver energy to consumers reliably and safely is perhaps one of our greatest challenges. This is especially true since renewable energy promises to become a substantial generation source.

Since sources of renewable energy are often found in remote locations, we simply have to develop the capacity to deliver it to load centers. Basically, if we want to use more renewable energy, we need more wires.

Accordingly, in 2009, the office will continue work to implement the major electricity infrastructure provisions of the Energy Policy Act of 2005. Consistent with the law, we will produce the second national transmission congestion study by August of next year. We will begin scoping for the designation of energy transport corridors in the eastern United States, and we will implement the Department's responsibilities to coordinate Federal authorizations for the siting of transmission facilities.

However, energy security and reliability will not be solved solely through the modernization and expansion of our energy infrastructure. We also need to ensure energy delivery by keeping it secure and responding quickly when it is disrupted.

In fiscal year 2009, we will work to identify systemwide vulnerabilities in power and fuels at key domestic and select foreign energy sector assets and develop plans to secure and reconstitute those assets. We will help to develop tools and mitigation solutions to help energy sector owners and operators improve resiliency and implement best and effective practices and provide solutions to State and local governments to address energy supply and infrastructure challenges and to exercise those plans.

PREPARED STATEMENT

I believe our work in OE is vital to the Nation's energy health and the increase in the President's request reflects this. Federal investment in the research, development, and deployment of new technology, combined with innovative policies and infrastructure investment, is essential to improving grid performance and ensuring our energy security, economic competitiveness, and environmental well-being.

This concludes my statement, Mr. Chairman. I look forward to answering your and the committee's questions.

[The statement follows:]

PREPARED STATEMENT OF HON. KEVIN M. KOLEVAR

Mr. Chairman and members of the committee, thank you for this opportunity to testify on the President's fiscal year 2009 budget request for the Office of Electricity Delivery and Energy Reliability.

The mission of the Office of Electricity Delivery and Energy Reliability (OE) is to lead national efforts to modernize the electricity delivery system, enhance the security and reliability of America's energy infrastructure, and facilitate recovery from disruptions to energy supply. These functions are vital to the Department of Energy's (DOE) strategic goal of protecting our national and economic security by promoting a diverse supply and delivery of reliable, affordable, and environmentally responsible energy.

The President's fiscal year 2009 budget includes $134 million for OE in fiscal year 2009, which is almost a 17 percent increase from the fiscal year 2008 request. This includes $100.2 million for Research and Development activities, $14.1 million for Operations and Analysis activities, and $19.7 million for Program Direction. My tes-

timony on the administration's fiscal year 2009 budget request reflects a comparison to the administration's fiscal year 2008 budget request.

Today, the availability and access to electricity is something that most Americans take for granted. Most people cannot describe what it is or where it comes from. Yet, it is vital to nearly every aspect of our lives from powering our electronics and heating our homes to supporting transportation, finance, food and water systems, and national security.

The Energy Information Administration has estimated that by the year 2030, U.S. electricity consumption will be almost 35 percent higher than it was in 2009. This indicates a growing economy, but it also promises a significant amount of new demand on the electricity infrastructure—an infrastructure that is already stressed and aging. This means that we need to focus our attention on reliability.

Climate change is also affecting electric industry investments. The uncertainty in climate change legislation and policies is limiting investment in generation from fossil fuels and is stimulating investment in renewables such as wind. However intermittent resources such as renewables require energy storage or other balancing technologies, advanced communications and sophisticated modeling to maximize penetration without affecting the reliability and efficiency of our electric system.

One of the Department's strategies for reducing our dependence on foreign oil is increased electrification by transitioning to electric vehicles also known as plug-in hybrids. Plug-in hybrids could provide a great opportunity if we begin now to enable smart grid features such as enhanced intelligence and control.

Title 13 and section 641 of the Energy Security and Independence Act of 2007 highlights the need for the development of a modernized grid. Title 13 addresses the need for a Smart Grid, which is a transmission and distribution network modernized with the latest digital and information technologies for enhanced operational monitoring, control, and intelligence.

OE's fiscal year 2009 budget request also reflects a commitment to ensuring reliability by supporting research of breakthrough technologies such as those associated with a Smart Grid and Energy Storage. With $5 million dedicated solely to Smart Grid development, a $6.6 million increase in the fiscal year 2009 request for Energy Storage, and more than $88 million dedicated to other R&D work, the President's fiscal year 2009 budget request reaffirms the effort to ensure increased reliability through R&D.

Modernizing the grid through technical innovation, however, represents just one side of the effort needed to tackle electricity reliability problems. Building the elaborate network of wires and other facilities needed to deliver energy to consumers reliably and safely is perhaps one of our greatest challenges today. This is especially true since renewable energy promises to become a substantial generation source. Since sources of renewable energy are often found in remote locations, we simply have to develop the capability to deliver it to load centers. Basically, if we want to use more renewable energy, we need more wires.

However, energy security and reliability will not be solved by focusing solely on expanding our modernization and expansion of our energy infrastructure. We also need to ensure energy delivery by keeping it secure and responding quickly when it is disrupted. DOE is the lead agency when Federal response is required for temporary disruptions in energy supply to ensure a reliable and secure electricity infrastructure for every American. We will use fiscal year 2009 funds to apply technical expertise to ensure the security, resiliency and survivability of key energy assets and critical energy infrastructure at home and abroad.

The reliability and energy security effort is both multifaceted and necessary, and the President's request reflects this.

RESEARCH AND DEVELOPMENT

Our High Temperature Superconductivity activities continue to support second generation wire development as well as research on dielectrics, cryogenics, and cable systems. This activity is being refocused to address a near-term critical need within the electric system to not only increase current carrying capacity, but also to relieve overburdened cables elsewhere in the local grid. The superconductivity industry in the United States is now at the critical stage of moving from small business development to becoming a part of our manufacturing base.

Enhanced security for control systems is critical to the development of a reliable and resilient modern grid. The Visualization and Controls Research & Development activity focuses on improving our ability to measure and address the vulnerabilities of controls systems, detect cyber intrusion, implement protective measures and response strategies, and sustain cyber security improvements over time.

This activity is also developing the next generation system control and data acquisition (SCADA) system that features GPS-synchronized grid monitoring, secure data communications, custom visualization and operator cueing, and advanced control algorithms. Advanced visualization and control systems will allow operators to detect disturbances and take corrective action before problems cascade into widespread outages. The need to improve electric power control systems security is well-recognized by both the private and public sectors.

The Energy Storage and Power Electronics activities propose an increase of $6.6 million in fiscal year 2009. This will support the development of new and improved energy storage devices and systems at utility scale, which will be incorporated in DOE's Basic Energy Science basic research results. We will also work to achieve substantial improvements in seeking lifetime, reliability, energy density, and cost of energy storage devices. Through this, highly leveraged prototype testing and utility demonstration projects will be expanded with State energy office participation focusing on areas of greatest utility need. The increase will also serve to focus on enhanced research in Power Electronics to improve material and device properties needed for transmission-level applications.

Large scale, megawatt-level electricity storage systems, or multiple, smaller distributed storage systems, could significantly reduce transmission system congestion, manage peak loads, make renewable electricity sources more dispatchable, and increase the reliability of the overall electric grid.

The Renewable and Distributed Systems Integration activities will allocate $5 million in fiscal year 2009 to develop and demonstrate Smart Grid technologies for an integrated and intelligent electric transmission and distribution network. $28.3 million will be used to demonstrate distributed energy systems as a resource to decrease peak electric load demand, increase asset utilization, and defer electric system upgrades. These funds will also be used to develop renewable energy grid integration technologies to facilitate increased deployment of renewables and other clean energy sources.

PERMITTING, SITING, AND ANALYSIS

With hopes of creating a more robust transmission system, our fiscal year 2009 budget request asks for $6.5 million for the Permitting, Siting and Analysis office. This is an $804,000 increase from the fiscal year 2008 budget request, and it will help to implement major electricity infrastructure provisions such as section 368 of EPACT and section 216(h) of the Federal Power Act. Further, work will be done to provide technical assistance to State electricity regulatory agencies and to electric utilities as they implement their energy efficiency initiatives.

In fiscal year 2009, we will also be working to issue the second national transmission congestion study. In this process, we will be consulting with States and other interested parties on congestion metrics and data, and analyzing current historical congestion by region. Before the study is released, we will present draft conclusions of data analysis for public review and input.

The implementation of section 368 of EPACT requires the designation of rights-of-way corridors for the transport of oil, natural gas, hydrogen, and electricity on Federal lands in the 11 contiguous western States. An interagency team, with DOE as the lead agency, conducted public scoping meetings concerning the designation of corridors in each of the 11 contiguous western States. We have published a draft Programmatic Environmental Impact Statement for the designation of the energy transport corridors, solicited public comments, and conducted 15 public meetings, and the final PEIS is expected to be published in fiscal year 2008. We are preparing to begin scoping for the designation of energy transport corridors in the eastern States, Alaska, and Hawaii. The EIS for the remaining designations is expected before the end of fiscal year 2009.

DOE is preparing regulations to implement its responsibilities under the new section 216(h) of the Federal Power Act to coordinate with eight other Federal agencies to prepare initial calendars, with milestones and deadlines for the Federal authorizations and related reviews required for the siting of transmission facilities. DOE will maintain a public website that will contain a complete record of Federal authorizations and related environmental reviews and will work closely with the lead Federal NEPA agency to encourage complete and expedited Federal reviews.

INFRASTRUCTURE SECURITY AND ENERGY RESTORATION

The President has designated the Department of Energy as the Lead Sector Specific Agency responsible for facilitating the protection of the Nation's critical energy infrastructure. The Office of Infrastructure Security and Energy Restoration (ISER) in the operations and analysis subprogram is responsible for coordinating and car-

rying out the Department's obligations to support the Department of Homeland Security in this important national initiative. The fiscal year 2009 request is for $7.6 million in funding for Infrastructure Security and Energy Restoration within the operations and analysis subprogram, which is a $1.8 million increase from the fiscal year 2008 request.

In fiscal year 2009, ISER will work to identify system-wide vulnerabilities in power, fuels and other key energy sector assets and develop plans to secure and reconstitute those assets. We will help to develop tools and mitigation solutions to help energy sector owners and operators improve resiliency and implement best and effective practices, and provide solutions to State and local governments to address energy supply and infrastructure challenges. Further, we will continue to conduct vulnerability assessments of key domestic and selected foreign energy facilities in close collaboration with appropriate interagency and industry partners. And through the initialization of selected pilot projects, we will work to exercise the integration of regional, State and local energy resiliency and emergency response preparedness.

We help to facilitate energy restoration efforts at the State and local level through cooperation and partnerships with local utility providers in support of the National Response Framework. In fiscal year 2009, we will work to create detailed Concept of Operations Plans for energy response utilizing an Integrated Planning System.

CONCLUSION

As you have heard, our work in OE is vital to our Nation's energy health and the increase in the President's request reflects this. Through our research and development of technologies such as power electronics, high temperature superconductivity, and energy storage, we will work to lower costs, increase efficiency, and also directly enhance the viability of clean energy resources by addressing issues such as intermittency, controllability, and environmental impact.

Federal investment in the research, development, and deployment of new technology combined with innovative policies and infrastructure investment, is essential to improving grid performance and ensuring our energy security, economic competitiveness, and environmental well-being.

This concludes my statement, Mr. Chairman. I look forward to answering any questions you and your colleagues may have.

Senator DORGAN. Secretary Kolevar, I thank you very much.

Mr. Slutz, you are the Acting Assistant Secretary, I believe, and we appreciate very much your being here today to describe your programs, and as I indicated in my opening statement, I'm going to ask a number of questions about the fossil energy accounts, but why don't you proceed? We will then have the panel ask questions of the three witnesses.

OFFICE OF FOSSIL ENERGY

STATEMENT OF JAMES SLUTZ, ACTING PRINCIPAL DEPUTY ASSISTANT SECRETARY FOR FOSSIL ENERGY

Mr. SLUTZ. Mr. Chairman, members of the committee, it's a pleasure for me to appear before you today to present the Office of Fossil Energy's proposed fiscal year 2009 budget.

Fossil Energy's budget request of $1.127 billion for fiscal year 2009 is one of the largest Fossil Energy requests made by this administration. These funds will allow FE to fulfill its mission to create public benefits to supply enhancing U.S. economic, environmental, and energy security.

Achieving this mission means developing technological capabilities that can dramatically reduce carbon emissions to achieve near-zero atmospheric emission power production, thereby meeting the President's priority of expanding our climate change options with higher efficiency power plants to reduce carbon dioxide emissions, the near-zero emissions power plants, known as FutureGen, that link high efficiency with carbon sequestration.

Fossil Energy is also responsible for the management and operation of the Nation's petroleum reserves, most notably the Strategic Petroleum Reserve, which provides strategic and economic security against disruptions in oil supplies with an emergency stockpile of crude oil.

More specifically, the proposed fiscal year 2009 coal budget request of $648 million focuses on technology for allowing the United States to maintain its technological lead in coal use in a way that will not raise climate concerns. This is the largest budget request for coal research and development and demonstration in over 25 years.

The budget focuses on advancing the technology aimed at reducing costs and enhancing the efficiency of power plants with carbon capture. It also focuses on the science and technology to assure the safe and effective long-term geologic storage of carbon dioxide.

The budget includes $406 million for coal R&D, including in-house research and development, $85 million for the Clean Coal Power Initiative, and $156 million for the New Approach to the FutureGen Program. The fiscal year 2009 request demonstrates the administration's continuing commitment to domestically produced energy from coal.

The $344 million in the fiscal year 2009 budget request for the Strategic Petroleum Reserve, an 84 percent increase over fiscal year 2008, will allow for expansion of facilities at two existing storage sites and begin the development of a new site in fiscal year 2009. This expansion is in accordance with the provision in EPACT for an expansion of reserve capacity from 750 million to 1 billion barrels of oil and, with the President's recommendation and pending legislation, to further increase the reserve's capacity to 1.5 billion barrels of oil.

Fossil Energy research and development is directed at electric power generation from coal——

Senator DORGAN. Secretary Slutz, could you hold a moment?

Senator DOMENICI. You mentioned how much was being spent on coal R&D and you talked about how it was a good program.

Where do we do most of the research that we're talking about and who's the head of the research to try to make the change to coal so it's more usable?

Mr. SLUTZ. We have a coal program here that's headed by Dr. Victor Der at headquarters, but then that program is implemented through the National Energy Technology Laboratory and Carl Bauer is the director of the National Energy Technology Laboratory.

Senator DOMENICI. And where is that laboratory?

Mr. SLUTZ. That laboratory is located in Pittsburgh and Morgantown, co-located with other facilities in Tulsa and Albany, Oregon.

Senator DOMENICI. Mr. Chairman, thank you, sir.

Senator DORGAN. You may proceed.

Mr. SLUTZ. Fossil Energy research and development is directed at electric power generation from coal, our most abundant and lowest cost domestic fossil fuel.

This research supports many presidential initiatives and priorities, including the Coal Research Initiative, Hydrogen Fuel Initiative, Climate Change Technology Program, and FutureGen.

I'll highlight a few of the R&D program components, beginning with FutureGen. FutureGen promotes advanced full-scale integration of integrated gasification compliance cycle and carbon capture and storage technology to produce electric power from coal with near-zero atmospheric emissions.

FutureGen is being restructured in a way that accelerates the commercial use of near-zero emissions technology. The new approach proposes multiple commercial-scale demonstration power plants in place of the original plan's single R&D facilities. Each plant would produce electricity and sequester an estimated annual 1 million metric tons of carbon dioxide.

FutureGen receives almost $82 million funding increase over last year in the 2009 budget proposal.

The Clean Coal Power Initiative, or CCPI, is a cooperative cost-share program between the government and industry to demonstrate advanced coal-based power generation technologies. The budget request of $85 million for CCPI in fiscal year 2009 will complete the third round of the project solicitations, proposed evaluations, and project selections of advanced technology systems that capture carbon dioxide for sequestration for beneficial reuse.

The fiscal year 2009 budget request of $149 million for carbon sequestration, one of the key components of our program, is a significant increase over the fiscal year 2008.

Senator DOMENICI. Would you say that again? I missed the last portion of that.

Mr. SLUTZ. Our 2009 budget request just for carbon sequestration, the carbon storage component, is $149 million. That's an increase of $30 million over the $119 million provided in fiscal year 2008.

Senator DOMENICI. Okay.

Mr. SLUTZ. The increase should help develop economical ways to separate and permanently sequester greenhouse gas emissions from the combustion of fossil fuels.

Consistent with recent budget requests, the petroleum, which is oil technology and natural gas technologies research and development programs are being proposed for termination in 2009.

The fiscal year 2009 budget request of $344 million for the Strategic Petroleum Reserve would continue preparations for doubling the current 727-million-barrel capacity and increasing the drawdown capability from 4.4 million barrels per day to more than 6 million barrels per day. Increasing the capacity required—requires expanding two existing sites and adding one new site.

That concludes a brief overview of Fossil Energy's wide-ranging R&D and petroleum reserve management responsibilities.

PREPARED STATEMENT

I'd like to emphasize, by reevaluating, refining and refocusing our programs and funding the most cost-effective and beneficial projects, the fiscal year 2009 budget submission meets the Nation's critical needs for energy, environment, and national security.

Mr. Chairman, that concludes my prepared statement, and I'm happy to answer any questions.

[The statement follows:]

PREPARED STATEMENT OF JAMES SLUTZ

Mr. Chairman, members of the committee, it is a pleasure for me to appear before you today to present the Office of Fossil Energy's (FE) proposed budget for fiscal year 2009.

FE's budget request of $1.127 billion for fiscal year 2009 is one of the largest FE requests made by this administration. These funds will allow FE to fulfill its mission: to create public benefits by enhancing U.S. economic, environmental, and energy security.

Achieving this mission means developing technological capabilities that can dramatically reduce carbon emissions to achieve near-zero atmospheric emissions power production, thereby meeting the President's priority of expanding our climate change options with higher-efficiency power plants to reduce carbon dioxide and other emissions, including through FutureGen demonstration plants.

FE is also responsible for the management and operation of the Nation's petroleum reserves, most notably the Strategic Petroleum Reserve, which provides strategic and economic security against disruptions in oil supplies with an emergency stockpile of crude oil.

More specifically, the proposed fiscal year 2009 coal budget request of $648 million focuses on technology allowing the United States to maintain its technological lead in coal use in a way that addresses climate concerns. This is the largest budget request for coal research development and demonstration in over 25 years and leverages a nearly $1 billion investment in Clean Coal Technology.

The budget includes $406.5 million for Coal R&D including in-house R&D; $85 million for the Clean Coal Power Initiative and $156 million for a new approach to the FutureGen program.

The fiscal year 2009 request demonstrates the administration's continuing commitment to domestically produced energy from coal. Combined with the required private sector cost sharing contribution as directed by the Energy Policy Act of 2005 (EPACT), this budget will bring the total public and private investment in coal technology leveraged by FE to nearly $1 billion. In addition, the Federal Government provides support to advance coal technologies through tax incentives for clean coal plants, and through loan guarantees to be allocated to various types of coal power and other gasification projects.

The $344 million fiscal year 2009 budget request for the Strategic Petroleum Reserve, an 84 percent increase over fiscal year 2008 approved funding, will allow for expansion activities at two existing storage sites and the development of a new site in fiscal year 2009. This expansion is in accordance with the provision in EPACT for an expansion of reserve capacity from 727 million to 1 billion barrels of oil, and with the president's recommendation to further increase the reserve's capacity to 1.5 billion barrels of oil.

FOSSIL ENERGY RESEARCH AND DEVELOPMENT

I will begin the detailed presentation of our proposed budget with the work of Fossil Energy Research and Development (FERD), which is directed at electric power generation from coal, our most abundant and lowest cost domestic fossil fuel. Coal today accounts for nearly one-quarter of all the energy—and about half the electricity—consumed in the United States.

FERD supports many Presidential initiatives and priorities including the Coal Research Initiative, Hydrogen Fuel Initiative, and FutureGen. FERD also supports the Climate Change Technology Program, which is a priority for the Department. The components of the FERD program begin with FutureGen.

FUTUREGEN

FutureGen promotes advanced, full-scale integration of integrated gasification combined cycle (IGCC) and carbon capture and storage technology to produce electric power from coal while capturing and sequestering carbon dioxide (CO_2), resulting in near-zero atmospheric emissions coal energy systems. FERD is restructuring FutureGen in a way that accelerates the commercial use of carbon capture and storage technologies.

The new approach proposes multiple 300–600 Megawatt (MW) commercial-scale demonstration clean coal power plants—as opposed to a single, 275 MW R&D facility—each producing electricity and capturing and safely sequestering at least an estimated annual 1 million metric tons of CO_2 from each. FutureGen receives an $81.7 million funding increase from fiscal year 2008 in the fiscal year 2009 budget proposal.

CLEAN COAL POWER INITIATIVE

The Clean Coal Power Initiative (CCPI) is a cooperative, cost-shared program between the Government and industry to demonstrate advanced coal-based power generation technologies. CCPI is now focused on projects to help accelerate development and deployment of coal technologies that could economically capture carbon dioxide, including increasing the efficiency and reliability of carbon capture technologies. CCPI allows the Nation's power generators, equipment manufacturers, and coal producers to help identify the most critical barriers to coal use and the most promising advanced technologies to use coal cleanly, affordably, and with higher efficiencies that reduce carbon intensity.

The budget request of $85 million for CCPI in fiscal year 2009 will complete the third round of project solicitations, proposal evaluations, and project selections of advanced technology systems that capture carbon dioxide for sequestration or beneficial reuse.

SEQUESTRATION

The fiscal year 2009 budget request of $149 million for carbon sequestration, one of the key components of the Fuel and Power Systems program, is an increase of $30 million over the $119 million provided in fiscal year 2008.

The increase should help develop economical ways to separate and permanently store (sequester) greenhouse gas emissions from the combustion of fossil fuels. The technologies will help existing and future fossil fuel power generating facilities by reducing the cost of electricity impacts and also providing protocols for carbon capture and storage demonstrations to capture, transport, store, and monitor the CO_2 injected in geologic formations.

The increase will support site selection and characterization, regulatory permits, community outreach, and completion of site operation plans for large-scale, geologic, carbon storage tests. It will also fund large-scale injections and remaining infrastructure development. The additional funding also permits work on capture projects and initiates an effort to prepare for and augment the monitoring, measurement and verification being conducted in the Phase III tests.

HYDROGEN

The budget request of $10 million in fiscal year 2009 for hydrogen from coal—a clean fuel for future advanced power technologies such as fuel cells and transportation systems—is down nearly $15 million from fiscal year 2008. The decrease is due to the elimination of integrated coal-biomass processing for carbon emissions research (which is generally advanced through the gasification program), elimination of substitute natural gas and coal-to-liquids production research (which are mature industries and not the high-return investment that FE focuses on), and a rightsizing of the effort level for early engineering and design studies on hydrogen production modules in near-zero emission coal plants.

GASIFICATION TECHNOLOGY

The Integrated Gasification Combined Cycle (IGCC) budget request for fiscal year 2009 is $69 million, a $15.5 million increase over fiscal year 2008. The IGCC program develops advanced gasification-based technologies aimed at reducing the cost of coal-based IGCC plants, improving thermal efficiency, and achieving near-zero atmospheric emissions of all pollutants. These technologies will be an integral part of the carbon capture and storage demonstration projects.

FUEL CELLS

Flexible fuel cell systems that can operate in central coal-based power systems and with applications for electric utility, industrial and commercial/residential markets, receive a funding request of $60 million in fiscal year 2009—an increase over the fiscal year 2008 appropriation of $55.5 million. This activity enables the generation of highly efficient, cost-effective electricity from domestic coal with near-zero atmospheric emissions of carbon and air pollutants in central station applications. The technology also provides the technology base to permit grid-independent distributed generation applications.

OIL AND NATURAL GAS TECHNOLOGY

Consistent with the budget requests for fiscal years 2006, 2007 and 2008, the Petroleum-Oil Technology and Natural Gas Technologies research and development programs are being terminated in fiscal year 2009.

The Ultra-Deepwater and Unconventional Gas and Other Petroleum Research Fund was created by the Energy Policy Act of 2005 (Public Law 109–58) as a mandatory program beginning in fiscal year 2007. The program is funded from mandatory Federal revenues from oil and gas leases. Consistent with the fiscal year 2007 and 2008 budget requests, the fiscal year 2009 budget proposes to repeal the program through a legislative proposal.

STRATEGIC PETROLEUM RESERVE

The Strategic Petroleum Reserve (SPR) exists to ensure America's readiness to respond to severe energy supply disruptions. The Energy Policy Act of 2005 directs DOE to fill the SPR to its authorized 1 billion barrel capacity as expeditiously as practicable. Additionally the President has proposed expanding the Reserve's capacity to 1.5 billion barrels.

The fiscal year 2009 budget request of $344 million would continue preparations for doubling the current 727 million barrel capacity up to 1.5 billion barrels and increasing the drawdown capability from 4.4 million barrels per day (MMB/day) to more than 6 MMB/day. The administration strongly believes that this expansion is necessary to protect the economic and energy security of the Nation, given the increased risk of disruption that is now apparent in the global oil market. Increasing the inventory to 1 billion barrels requires expanding two existing sites and adding one new site.

The fiscal year 2009 budget request reflects completion of land acquisition activities for the Richton, Mississippi site in fiscal year 2008 and the addition of expansion activities at the two existing sites and the new site in fiscal year 2009.

NORTHEAST HOME HEATING OIL RESERVE

The fiscal year 2009 budget request of $9.8 million will fund continuing operation of the Reserve and the leasing of commercial storage space.

The President directed DOE in 2000 to establish a Northeast heating oil reserve which is capable of assuring a short-term supplement to private home heating oil supplies during times of very low inventories or in the event of significant threats to immediate energy supplies. The 2 million barrel reserve protects the Northeast against a supply disruption for up to 10 days, the time required for ships to carry heating oil from the Gulf of Mexico to New York Harbor.

NAVAL PETROLEUM AND OIL SHALE RESERVES

The fiscal year 2009 budget request of $19.1 million is slightly less than the fiscal year 2008 request of $20.3 million. The decrease is due to the completion of the Risk Assessment and Corrective Action Studies to determine the cleanup requirements of the Elk Hills site (NPR–1) and reductions in operating and facility maintenance costs at NPR–3.

The Naval Petroleum and Oil Shale Reserve (NPOSR) mission is to complete environmental remediation activities and determine the equity finalization of NPR–1 and to operate NPR–3 until its economic limit is reached, while maintaining the Rocky Mountain Oil Field Test Center as a field demonstration facility. Because the NPOSR no longer served the national defense purpose envisioned in the early 1900s, the National Defense Authorization Act for Fiscal Year 1996 (Public Law 104–106) required the sale of the Government's interest in Naval Petroleum Reserve 1 (NPR–1).

To comply with this requirement, the Elk Hills field in California was sold to Occidental Petroleum Corporation in 1998, two of the Naval Oil Shale Reserves (NOSR–1 and NOSR–3) were transferred to the Department of the Interior's (DOI) Bureau of Land Management, and the NOSR–2 site was returned to the Northern Ute Indian Tribe.

The Energy Policy Act of 2005 transferred administrative jurisdiction and environmental remediation of Naval Petroleum Reserve 2 (NPR–2) in California to the Department of the Interior. DOE retains the Naval Petroleum Reserve 3 (NPR–3) in Wyoming (Teapot Dome field). Environmental remediation is performed on those facilities which no longer have value to either of the missions.

MEETING THE NATION'S CRITICAL ENERGY NEEDS

In conclusion, I'd like to emphasize that the Office of Fossil Energy's programs are designed to promote the cost-effective development of energy systems and practices that will provide current and future generations with energy that is clean, efficient, reasonably priced, and reliable. Our focus is on supporting the President's top priorities for energy security, clean air, climate change, and coal research. By re-

evaluating, refining and refocusing our programs and funding the most cost-effective and beneficial projects, the fiscal year 2009 budget submission is designed to help meet the Nation's needs for energy, environmental and national security.

Mr. Chairman, and members of the committee, this completes my prepared statement. I would be happy to answer any questions you may have at this time.

POWER OUTAGE IN FLORIDA

Senator DORGAN. Mr. Slutz, thank you very much.

Mr. Kolevar, as you know, the recent power outage in south Florida disrupted normal life for more than 1 million people for a number of hours. The news reports that I read said the system worked as it was supposed to, shutting down transformers and power units, including two nuclear power sites, and then I read later that it was a human error.

So, how is it the system worked as it was supposed to work? I mean tell me about what has happened there.

Mr. KOLEVAR. The system did work as it was designed. It was human error. The individual took down protective relays at a substation during maintenance, attempted to put the relay back online without reengaging the protective systems and caused a short and a voltage drop within the system that affected Turkey Point and, subsequent to Turkey Point's going offline, other generation units.

And the system is designed to try and limit the cascading effects of a drop in voltage and certainly the drop of generation. The drop in generation, 4,000 megawatts, was felt all the way through the system. Operators in New York could see that something had happened. They didn't know what it was, but they could see that something had happened.

The reason I make that point is because that, while they could see it as far north as New York and probably farther north into Canada, the system was able to contain that outage, localize it, and Florida Power and Light did an impressive job of getting service back on to all of their customers in about a 3- or 4-hour time frame.

STRATEGIC PETROLEUM RESERVE

Senator DORGAN. Mr. Slutz, in the Office of Fossil Energy, there's about a $200 million increase in the fiscal year 2008 enacted versus the administration's 2009 request. It appears to me that about $160 million of that is for the expansion of the Strategic Petroleum Reserve. Is that correct?

Isn't a substantial portion of your increase for the increased request for the SPR?

Mr. SLUTZ. Correct. About—yes.

Senator DORGAN. Yes. And you heard me describe why I support SPR. I've always supported saving and creating an energy security blanket here with Strategic Petroleum Reserve, but I just think it is nuts at about $100 a barrel to be sticking that oil underground and taking it out of supply. And so, to the extent the chairman has the votes on this subcommittee, I intend in the chairman's mark to stop this on the first day of the next fiscal year. My hope is that I'll be able to stop it earlier than that on the floor of the Senate by adding it to another piece of legislation.

We shouldn't be putting 60,000 or 70,000 barrels a day today underground, and we shouldn't increase that to 120,000 barrels a day

in the second half of this year. So, I just want you to know that, to say that we have a substantial increase in the Office of Fossil Energy, when I understand most of that increase is in the SPR, building facilities and so on is deceiving. My major concern is in the fossil R&D accounts because half of this electricity comes from coal, and if we're going to be able to use coal in the future, we need to have expanded carbon capture and carbon sequestration activities. That's going to require a lot of effort and a lot of resources.

FOSSIL BUDGET PRIORITIES

Mr. Slutz, when you talk about increasing the request for carbon sequestration by $30 million, I've got to tell you that's a drip as opposed to a stream that's needed for us because there's an urgency for action.

We need to figure out how do we capture and how do we sequester carbon in order to continue to use coal. I've had some really interesting people come in to talk to me. There is a Texas demonstration project where they are turning the effluents from that plant into chloride, hydrogen, and baking soda, and the CO_2 from the plant is embedded in the baking soda, and they put it in the landfill. That's interesting to me.

I'm going to go see a location within the next couple of weeks where they're taking the CO_2 and feeding a contiguous algae pond, because algae lives on wastewater and CO_2. They not only consume the CO_2 with algae, but then they process the algae for a super fuel. So, you destroy the CO_2, and you produce diesel as a result.

So, a lot of interesting things going on, but in response to Senator Domenici's question, I think Carl Bauer is an extraordinary resource for us. He's running a great operation over there, but we need to do a lot of projects, both in research and demonstration and deployment of technologies. However, in my judgment, to take most of the increase in your Office of Fossil Energy and direct it into SPR doesn't make a lot of sense to me.

We need to be directing that, in my judgment, into fossil R&D so that we can use our coal resources in the future in a way that captures the carbon and doesn't contribute to global warming. Your response?

Mr. SLUTZ. Well, I think there are two key components that are significant. The Coal Program does have significant increases. That was a—the $648 million that is focused, proposed for coal research and development, is more than 25 percent—I think it's a 25 percent increase and that includes——

Senator DORGAN. That includes FutureGen?

Mr. SLUTZ. Yes, yes. When you look at the Coal Program and break it down, there are both key demonstration projects, which include FutureGen and the CCPI Program, and then other very important research aspects. And there's about 400—I think $400 million in the research programs and then—well, $156 million for FutureGen and $85 million for CCPI, and the $156 million for FutureGen is about—I think I mentioned it was an $80 some million increase from previous budgets.

So, there is significant increase in coal. There is an increase—we're proposing about a $171 million in the SPR budget for developing new facilities. All but $13 million of that $175 million is tar-

geted at increasing from 750 million to the 1 billion level which is what was authorized by EPACT.

There's only $13 million of that $171 million that is targeted for the 1 billion to 1.5, and that is for some initial environmental impact statement work and some of the analytical work needed on site selection. So, just kind of put that in the frame of reference that it is incremental steps that are being proposed for that.

Senator DORGAN. I understand that, but resources are scarce. In fact, as we give discretion to the Department with respect to this process, then we must use them wisely, I mean, if you were going to plan a journey with your car some day, and you say here's the road I'm taking and then somebody says, well, but there's a bridge out halfway through that trip. You say, well, it doesn't matter, I'm just going to take this road. But when we come to the bridge, we'll just drop off the bridge. This is your SPR policy.

That wouldn't be very smart, and it's not very smart for us to say here's the road we're taking with respect to SPR. No matter the consequences, no matter the circumstances, no matter the price of oil, we're still going to stick it underground.

I mean, my point is I think there's a need for a pause, a 1-year pause with a price-cap issue, and I'm going to work on that.

I don't know whether you have described, as Mr. Spurgeon has described, a 330 percent increase in his accounts in 7 years. He smiled broadly as he said it, and I'm sure he feels very good about it.

Have we had a 330 percent increase in the funding for clean coal technology and the fossil accounts in the last 7 years?

Mr. SLUTZ. I can't answer that question. I mean, I don't know the percent increase that we've had or what we had.

Senator DORGAN. I'm not diminishing Mr. Spurgeon's dramatic success, much of which should be attributed to my colleague to the left here, but——

Senator DOMENICI. Well, I don't have anything to do with running the Government.

Senator DORGAN. No, but, look, we've not been blind here. We understand what's been going on.

Senator DOMENICI. I thought it was a great priority to get nuclear power plants on board and there are.

Senator DORGAN. We have others that want to ask questions, and I want to recognize Senator Domenici, but I just want to say this.

CARBON SEQUESTRATION

There isn't a ghost of a chance of us being successful in our fossil programs unless we understand that to continue to use coal in the future, given what's coming at us and the debate on global climate change legislation, unless we decide this is urgent. It's going to require significant increases in research and also especially in development, because you've got to get the commercial-scale development applications to understand what technology works and at what cost. Both are very important.

So, as we work on this in this subcommittee, we're going to try to find a way to recalculate some of this and make bigger investments and bolder investments because we've got to continue to use

coal, but we have to do it in a manner that doesn't injure our environment.

We're not going to have a future without coal. The question is what kind of a future are we going to have with coal when we describe conditions of capture and sequestration? I'm a real believer that technology can solve some of these problems, but technology isn't inexpensive, and so, Mr. Slutz, I'm hoping that the next time you come, you'll be able to smile as Mr. Spurgeon has about what we might be able to do to increase the accounts that you can't ask for because you've got to be here supporting the President's request. You know and I know that, if we do what I think we should do to your accounts, you would be very appreciative.

Would you agree to that?

Mr. SLUTZ. I will agree that managing coal requires us to solve the carbon sequestration issue, and it is a huge challenge that we need to solve.

Senator DORGAN. Diplomatically said. Thank you. Senator Domenici.

Senator DOMENICI. Well, Mr. Chairman and members of the executive branch here in front of us, let me say, regardless of what my emphasis has been, along with others, like Senator Craig, in the field of nuclear and I'm trying to get a nuclear renaissance going, there's no doubt in my mind that the chairman has properly expressed the situation in the United States in terms of our future, and coal is an American—just the backbone of America's ability to solve the problem of having to import our energy needs.

In my opinion, it would be a good thing and maybe we could do this. We have been spending money on coal research and it not all comes to you. Some goes to the Department of the Interior, and I think it would be good if we asked the administration to submit to us the amount of money that's been spent on coal, clean coal research, and let "clean coal" be a generic term for any kind of research that's been done on coal to make it more usable and friendly to American ambient air standards and the like.

I'd like to see how much we've spent in the last 10 years, if you could ask them to tell us, and then if there are other departments that spend it, you could tell us who they are and we could ask them.

Senator DORGAN. Mr. Slutz, would you submit that to our committee?

Mr. SLUTZ. Yes. Yes, sir.

[The information follows:]

CLEAN COAL FUNDING

The Department of Energy has invested $3.4 billion in clean coal research over the last 10 years to dramatically reduce coal power plant emissions (including CO_2) and significantly improve efficiency, thereby reducing carbon emissions. While funding is not readily available, other Government agencies that invest in clean coal include the National Science Foundation, the Department of Interior and the U.S. Geological Survey.

CARBON SEQUESTRATION CONTINUES

Senator DOMENICI. What worries me is we've been—every year since I've been around doing my work on this subcommittee, we

hear about the additions that are made to research on clean coal. The new addition has been CO_2.

First we had clean coal and we weren't trying to get CO_2 out of it because climate wasn't a part of the issue. We were trying to clean it to meet the standard so we could use it in our utility. Now we've added to the research the burden of cleaning it and removing and making CO_2, the removal stick.

It seems to me that is a question to ask you and maybe you can get your experts to tell us. Has the fact that we are asking our researchers to find a way to remove and stabilize the removed CO_2 made the research job of cleaning up our coal more difficult and are we ignoring clean coal and putting more effort on clean coal and carbon sequestration? Do you understand my concern?

Mr. SLUTZ. As we focus on CO_2, we're missing some of the other aspects.

Senator DOMENICI. Making it more difficult. If we broke through and had clean coal, that'd be one thing. That'd be a pretty giant step. We've tried that for years. At least the utility companies and America would say we could burn that coal.

If we say research clean coal and carbon sequestration, we might be making the clean coal more difficult to achieve and we may be taking more time to get it done, and I think I'd like an answer from some of your experts as to what we're doing with our money in that regard.

NATURAL GAS AND COAL RESOURCES

It is very important. Right now the utilities of America are in an absolute dilemma, and that's your business and that's your business. You know they can't start a new powerplant, right? What they're all going to do is go to natural gas, right?

Mr. KOLEVAR. Yes, sir.

Senator DOMENICI. There's no question. They're going to be pushed up against the wall and they're going to eventually say whatever the cost, we have no other alternative. We're going to natural gas.

Mr. Kolevar, you don't think that's good policy for America, do you?

Mr. KOLEVAR. No, sir, it's not.

Senator DOMENICI. And then how about you in your research? You don't think that's good for America, do you?

Mr. SPURGEON. No, sir.

Mr. SLUTZ. I think its good policy. I think there's a role for each of those fuels. There's going to be a role for both natural gas and for clean coal. There's—it's not an if—it's not an either/or.

Senator DOMENICI. Sure.

Mr. SLUTZ. It's clearly both.

Senator DOMENICI. But if you ignore cleaning up the coal or make it take 10 years longer, your utilities can't sit by and wait. They're going to add capacity. You just described the capacity add-ons that are predicted by Caruso over there at—that does a great job. His predictions are probably as accurate as any, and he says they're going to have to add great capacity, right?

Mr. SLUTZ. Yes, sir.

Senator DOMENICI. Thirty-five—what does he say?

Mr. KOLEVAR. About 35 percent by 2030.

Senator DOMENICI. Do you know what the utilities are saying they're going to do to meet the requirement? We have nuclear coming along, but it's by nature pretty slow.

Mr. KOLEVAR. I think it's fair to say that a lot of utilities are not quite sure how they're going to get there.

Senator DOMENICI. That's correct.

Mr. KOLEVAR. But we are seeing the cancellation of planned coal units now, and much of that new generation coming online is going to be natural gas and that will make us more reliant on foreign sources of gas.

Senator DOMENICI. And you know what natural gas is worth now. Remember when we started, Larry? Now it's up to nine. When we started, look at here. It's nine-plus, and then they're going to have to use it, even though it's in short supply.

I have a number of questions, but I'm just going to get you on this, Bond and others, that keep attacking you. Are you feeling all right? Are you holding up under the barrage?

FUTUREGEN

Mr. SLUTZ. Thanks, Senator. Yes, we are—I'm holding up. We're holding up. It was not an easy decision to make the decision on FutureGen, I can tell you, and we're working through that. We're working through it with our various industry partners. And let me just add one, which I think is—and we'll have much more in the next few days to come out, but after we made the announcement, we immediately released a request for information.

We requested those comments come in by Monday, March 3. I was able to determine yesterday we received over 50 comments, which is very significant for that type of technical request for information.

I don't want to get ahead of myself because we need to analyze those comments, but I'm very optimistic that we have a path forward with this restructure of FutureGen that gets these projects out quicker in a full-scale commercial environment, and we're seeing a lot of interest by utilities because they see this as key to being able to use coal, and we're hearing a lot of excitement out there.

So, we need to work through these comments. We're going to be working over the next month with some structured outreach programs with industry. And we anticipate coming out with a funding opportunity announcement very soon, and we'll be working very closely with Congress as well on this.

Senator DOMENICI. Well, you've got to be smart on what you're going to do at the next go-around because you had the areas that were committed to this and perceived to have won, and now if you have a new program and there in some way it's made difficult for them to be participants, this issue will go on for years. And so my advice is to work with these companies that were part of your proposal before, and I'm sure you're going to do that.

Mr. SLUTZ. Yes. Yes, sir.

NUCLEAR ENERGY

Senator DOMENICI. Now let me talk about nuclear just for a little bit. Mr. Spurgeon, you're going to leave this Government when the President's term's up, I assume, or close thereto.

Mr. SPURGEON. Yes, sir.

Senator DOMENICI. First, I want to say together it would appear to me that your short term in this office will be evidenced by enormous positive success in the direction of nuclear power being used again in large quantities by America and certainly much more in the world than it ever has been, and we may be a player, whereas before we were doomed.

We may, in my opinion, be back at it producing engineers that are experts, et cetera, and we may be interested in nuclear power at every level.

Am I stating it halfway right?

Mr. SPURGEON. Yes, sir.

Senator DOMENICI. Now, since we've got nuclear power and got a lot of companies ready to go, there must be some things that are problematic about the future of nuclear power, and I might ask you in a minute to tell us a few, if you have them, but it seems to me that the overhang that is really big is, even though it's not as big a problem in my mind now as it was 10 years ago, but the problem of what are we going to do with the waste is the only thing that stands in the way of maximum acceptance of nuclear power.

You know that, right?

Mr. SPURGEON. Yes, sir.

Senator DOMENICI. That's the only thing people that know what they're talking about say and then it's accepted by the masses that, well, something's wrong, we don't have the waste control. We're doing darn well. We could stay a long time without a new repository because of the way things are right now.

But are we going to find a way, a direction to move ahead so that we are assured of the next step which would be a reprocessing, a recycling plant in America? Is that going to be set before you and Mr. Bodman leave office or not or do you know?

Mr. SPURGEON. I certainly hope so, sir. The future is always hard to predict, but we have all the ingredients in place that should allow that to happen, and that's not taking away anything from our long-term R&D efforts which will eventually get us to the point in advanced reactors and advanced systems that we need to get to and will get to some time later in this century.

But the key to the revival of nuclear energy is making concrete progress, and I don't mean that as a pun, but "concrete" meaning real things getting built.

Senator DOMENICI. You bet.

Mr. SPURGEON. That's our next step with respect to nuclear reactors in this country. We have the systems in place. We have some of the support mechanisms in place, but we need to push it over the goal line. Therein you'll see the emphasis in our 2010 program in this year's budget because it's the new reactors that are going to be the pole that gets the flywheel turning.

SPENT FUEL RECYCLING

But for the sustainability of nuclear energy long term—because we don't just need the 30 or so plants that are on the drawing boards in one stage or another today; we need more than 300 if we're going to have any chance of meeting some of our carbon goals in the near term. And so to do that then, we've got to solve that second of the two basic questions that have been out there for nuclear energy since the 40 years I've been in this business, which is, is it safe and what are you going to do with the waste?

I think we have basically answered the question through good, solid, reliable operation of our nuclear plants that it is safe. We've got that second one to answer, but I think we can do that by looking at the entire back end of the fuel cycle as a unit.

We need to look at used fuel and what is the best way and an integrated way of managing used fuel? Because through recycling, you can make the repository challenge much easier. You can put a much more stable waste form into the repository, making it such that it's easier to license, easier to——

Senator DOMENICI. What is the objection? What is the objection to recycling?

Mr. SPURGEON. It is something that goes back a long time. When this business started in the late 1960s and early 1970s, the whole policy was that the fuel coming out of a lightwater reactor would be recycled back into a lightwater reactor and the solidified, vitrified high-level waste would go into a repository, and at that point in time it was a salt mine that we were looking at for that kind of a repository. And that was our plan and that was moving forward, and that's when nuclear energy was going to provide a large share of our electric energy—projected to provide a large share of our electrical energy generation requirement.

In 1977, President Carter indefinitely deferred reprocessing in this country. Now President Reagan did reverse that in 1981, but by 1981 nuclear energy was kind of on the downslide and there was no basic economic or business imperative for us to move forward with recycling.

Senator DOMENICI. Yes, sir.

Mr. SPURGEON. But we're now getting back to where we're now seeing that curve again turn upward and where we do need a substantial amount of new nuclear power, and to do that, we are now relooking at, through the Advanced Fuel Cycle Initiative and other programs, the ability to recycle fuel.

I don't think—I'm sorry. I'll be quiet.

Senator DORGAN. Let me just mention, though, that I think it requires a longer discussion. The reprocessing decision in 1978 had to do with nonproliferation concerns. Valid or not, one might agree or disagree, this is also part of a concern about nonproliferation. So that's the origin of that, right?

Mr. SPURGEON. No question, sir.

Senator DORGAN. Okay.

Mr. SPURGEON. Actually, I was there. I mean, I was one of the people that were doing the report.

Senator DOMENICI. Well, just a minute because I ran out of time and you gave a long answer and that's sufficient. You've explained it.

I want to say this. President Carter did stop this by executive order, and he said it was based upon the desire of the United States that there not be the proliferation that this would add to the atmosphere and that if we didn't do it, others would not do it since we were a leader that the world followed. The problem is that was a mistake and they didn't sit by and say we'll skip reprocessing, we'll do something else. They reprocessed and we did not, and now we're in a position of deciding whether we should or not. And the chairman is correct, that President that did it had a good reason. The problem is that the reason didn't turn out to be right, and it's many, many years since the decision and Europe, led by France, is recycling. And that's one of the giant, giant concerns that we must confront, and I don't know whether we're ready to confront it. I am, but I don't know whether others are.

Thank you, Mr. Chairman.

Senator DORGAN. Senator Domenici, the reason I interrupted is only to say that the issue of reprocessing is not a technical issue. I mean, the decision wasn't made on a technical basis. It was made on a broader basis, and one might or might not feel it's time to revisit that.

I think the issue of reprocessing requires a discussion about the kinds of things Senator Domenici has just described and the kinds of things others would describe about reprocessing. That was my only point.

Senator Craig.

Senator DOMENICI. That was fine.

Senator CRAIG. Thank you very much, Mr. Chairman. I'll become a little more parochial. These are extremely valuable discussions, and I would suggest, as it relates to FutureGen and clean coal technology, I think the utility industry is ready to participate in phenomenally aggressive ways in partnerships to provide substantial resources.

One of the things, if I have any disappointment in this administration, is we've not crossed that line of partnerships that I think we must if we're going to bring the resources to bear on the urgency that you hear this committee speak of when we speak about technology and the future and the need.

Senator DOMENICI. You're right.

Senator CRAIG. We still think we have to fund everything out of the hip pocket of the taxpayer, and those relationships are to come and they must come. Whether it's building an NGNP or whether it's FutureGen, they have to be targeted, they have to build consensus, but there's phenomenal resource out there waiting.

I had the president of a major utility the other day tell me that they could meet the targets of a cap-and-trade in a reasonable fashion given the running room and the technology and the partnerships and the relationships with the Federal Government. But you all three understand, as we all four up here do, we have three people vying for the presidency today that hold nearly the same position on climate change and a scheme of cap-and-trade that nobody yet can figure out. And if that were to become policy today, the fuel

switching we talk about would go on and distort the marketplace in ways that are awfully hard to perceive because utilities would be forced to move in the direction they must move to build their base loads, the clean coal technology not being in place and certainly the nuclear backlog and the building of infrastructure there and capability that's obviously under way. That's a frustration to all of us, or certainly it is to this senator. It may not be to others.

ADVANCED TEST REACTOR

But, Dennis, last April, DOE designated the Advanced Test Reactor, ATR, as a national user facility. ATR is a unique test reactor that the university research community and the commercial nuclear industry can use to perform critical tests.

Up until now, only the lab and the Navy have had access to the ATR. Now the fiscal year 2009 DOE budget only includes $2.5 million for this activity.

Do you consider this to be enough funding and what more could be done with additional funding?

Mr. SPURGEON. I think it's a good start, sir. You're pointing out something that I consider to be a major accomplishment of moving the ATR into the marketplace, if you will, because it has a tremendous amount of untapped capabilities that can be used. And so, starting this summer, as you know, we are going to be having researchers from universities that are going to be starting to take advantage of that very unique facility.

So, is it a start? Is it an acceptable start? I believe so. I'm hoping that this will take off and grow, and we will continue this program because it's—it can be a great example of how we can take and make full use of our national assets, especially the ATR, which, while it's been around for quite awhile, it's a very young 30-year-old plant.

Senator CRAIG. Well, we'll watch it very closely because it is that nexus of partnership that I think ATR may assist us in doing, increasing those relationships with the private sector and the university communities that are going to be tremendously important.

ENVIRONMENTAL MANAGEMENT

When the Secretary testified before the Energy Committee, I asked him to respond to the Idaho delegation's repeated request to transfer clean-up liability from the lab to the clean-up contractor. The fiscal year 2009 budget did not provide funding for these clean-up activities in either of the NE or EM budgets.

Are you planning to fund these clean-up activities through NE? That would be the one question. What impact will this have on the R&D activities, like NGNP and GNEP, on the lab's infrastructure—and the lab's infrastructure?

Mr. SPURGEON. Obviously any clean-up activity that is done at Idaho, however the budget funds end up getting requested, would be managed through the EM contractor. Nuclear Energy is not in the business of doing clean-up. My office is not in the business of managing clean-up, but it all goes through the Idaho Operations Office.

Consequently, the issue here is more of how do we get adequate funds to manage the overall national clean-up activity that is ongo-

ing and that needs to continue? From my personal perspective, I'm in the business of building things. I'm not in the business of taking things apart. There's another organization within the Department that does that.

Senator CRAIG. Okay. Am I out of time, Mr. Chairman?

Senator DORGAN. Close.

OUTER CONTINENTAL SHELF RESOURCES

Senator CRAIG. Close. One last question then to you, Mr. Slutz, last year I included $10 million to perform an inventory analysis of domestic oil reserves in the Outer Continental Shelf, in the Energy and Water Appropriations bill.

What are your thoughts on investing in this type of analysis to establish once and for all the Nation's oil reserves to be used at a time of need?

And I say this because what we're looking at today is old knowledge, and yet we know that when incentivized, we went into the deep waters of the gulf and we applied today's technology and found phenomenal oil and oil reserves, and I am just amazed that we have decided to put a blindfold on because of the politics involved that are old, they're not the new politics that ought to be fitted to the new technologies. And I'm going to make a run at that again. I'm going to work awfully hard on it to see if we can't break through the mental fog out there of knowing where our country is as it relates to our reserves.

Senator DOMENICI. What is that, Senator, you're going to work on, the inventory?

Senator CRAIG. Ten million dollars to build the inventory.

Senator DOMENICI. We did it. You put it in and then they took it out, and we had to take it out in conference.

Senator CRAIG. I know we did it and——

Senator DOMENICI. It's not law yet.

Senator CRAIG [continuing]. My effort is to do it again.

Senator DOMENICI. Right. I got you. I didn't understand.

Senator CRAIG. Your thoughts, sir?

Mr. SLUTZ. Well, let me just tie it back in, I think broader, when you look at it from an oil and gas reserve assessment, technology assessment, it's actually something that, as a nation and the world, that we actually do need to do periodically.

It is probably—and I'll reference a study I was personally very involved in, was the National Petroleum Council Study that was titled "Facing the Hard Truth" when it was issued. And one of the key findings from that study, which was actually a study of studies and projections that are out there, was that it was something not just the United States but globally we needed to have a better understanding of our resource base and that it was time to really update that, and I think there's some real good information in that piece of work on how to get started under that.

And, of course, almost every projection in the world, I think, all except one major projection, relies on the United States Geological Survey and their reserve assessment. So, I think the United States has always shown leadership in reserve assessment. I think it is a critical issue, not just to know what we have in the offshore and Outer Continental Shelf but also, as we look more toward uncon-

ventional resources, past reserve assessments have not—because of new technology developments over the last probably 15 years, some of those past assessments don't actually take into account a lot of—for instance, what is the real opportunity with oil shale and some of those things?

So, yes, I think there is some opportunity there for us to better understand this.

Senator DORGAN. Mr. Slutz, thank you very much. I do want to mention that we put the inventory in our bill last year, and I supported that. But it properly belongs with the Interior Appropriations Subcommittee.

Mr. SLUTZ. Right.

Senator DORGAN. Both of us are on Interior, I believe. That's probably where we'll want to put it.

Mr. SLUTZ. I was giving you the general technology answer.

Senator DORGAN. I understand. I also want to make a point that the administration has zeroed out the ultra-deep and unconventional oil and gas drilling research. We added back the money in the past, but for the second year in a row, the administration zeroed that out. I think is a very big mistake because there are resources there that we need to further research and develop technologies so that we can find them.

PREPARED STATEMENT

Let me call on Senator Allard.

Senator ALLARD. Thank you, Mr. Chairman. I would like to have my statement made a part of the record, if I might.

Senator DORGAN. Without objection.

[The statement follows:]

PREPARED STATEMENT SENATOR WAYNE ALLARD

Mr. Chairman, thank you for holding this hearing today. I think it appropriate that we are hearing from, not only the offices responsible for dealing with electricity production, but also the Office of Delivery and Reliability. And as we are all aware, no amount of electricity does us any good if we cannot get it to where it is needed.

No one can argue that we are dangerously reliant on foreign sources of energy. We must decrease our reliance on foreign sources of energy by diversifying our energy sources and increasing conservation. I have long felt that a balanced energy portfolio which takes no technology off of the table is what is best for this Nation.

For this reason I am a strong supporter of nuclear energy. Nuclear generation facilities produce vast and reliable quantities of electricity. I am pleased with the recent movement toward increasing our nuclear capacity, which has been the result of the Energy Policy Act passed in 2005. I am hopeful that we can continue this progress.

In the area of fossil energy production, technological advancements have made the use of coal cleaner and more efficient than ever before. In the United States, and in the State of Colorado, we have vast amounts of domestic resources from traditional oil, coal and gas resources to unconventional sources such as oil shale. I firmly believe that we can and must continue to use these resources responsibly.

I look forward to working with the committee to ensure that research and development in all fields of energy technology are funded in a manner that is responsible, but sufficient to ensure that the development and implementation of new technologies continues.

Again, Mr. Chairman, thank you for holding this hearing. And thank you to all of the witnesses for being present.

SPENT FUEL RECYCLING

Senator ALLARD. Thank you, Mr. Chairman. My approach on our energy crisis is that we need to have a balanced approach. We can't take any energy source off the table right now, and I think that's critical. That's a position that I think is good for the country, happens to be good for the State of Colorado because we have lots of natural gas, we have lots of clean coal, we have lots of sources for renewable energies, and we have a lot of the technology to develop some of this.

The question that I have is when we're talking about nuclear energy, what is being done to—that you're familiar with—to push the recycling of nuclear energy?

I visited the recycling nuclear energy plants in Sellafield in England. I've been to France and visited those recycling units there, and anybody that hasn't been to those areas, I think they ought to spend the time to go there because it's American technology that they've taken to the European community, and I know that we're working on what we call a MOX plus, which means when we recycle, we end up with a byproduct that is more difficult to convert to a nuclear weapon of some type.

Would you comment on that recycling part on nuclear energy, please?

Mr. SPURGEON. From the budgetary standpoint, that's found in the Advanced Fuel Cycle Initiative, which is looking to develop the technologies which will allow us on a long-term basis to proceed forward with advanced recycling and also with advanced reactors that would then be used to recycle the material into.

On a near-term basis, we are looking at, well, what can we do to make the fuel cycle more proliferation resistant, that is, so that you don't separate out pure plutonium? I don't happen to call it MOX plus, but on the other hand your description of it is accurate. And that is something that we are looking at.

We look at that as the—I personally look at that as the next incremental step along the way toward the ultimate goal of long-term fast reactor recycle, but what that also does, as Senator Domenici was commenting on just a moment ago, it gets us to the point where we can have an easier solution than just disposing of used fuel directly in a repository, an easier solution to the disposition of high-level waste because the product of a recycle facility is a vitrified glass form that is easier to dispose of and gives us many more alternatives as to how we dispose of that material.

Senator ALLARD. Reduces the waste stream.

Mr. SPURGEON. It does reduce the waste stream. It reduces toxicity, but more importantly, if you just dispose of a spent fuel element, then you need to be able, because you don't know but what you might want to use that material and that resource that's still contained in there at some later time, it needs to be recoverable or retrievable. That defines a harder problem for a repository than if you're disposing of a glass log and it just needs to go in there and be safe for the time frame that needs to be maintained geologically stable.

CLEAN COAL RESEARCH

Senator ALLARD. Thank you for that. I also think that we have to continue to rely on working on our traditional energy sources. Mentioned was coal. Colorado has a source of clean coal because it's hard, has high mercury levels. You go further east, you have soft coal with lower mercury levels.

What is being done in clean coal technology to look at how we can easily remove mercury from coal? Is anything being done there?

Mr. SLUTZ. In the past, we have had programs that focused strictly on clean coal and particularly mercury, and that was in our Innovations to Existing Plants Program.

Now, what we've done is we are proposing in 2009—we actually proposed no funding in 2008 because much of that work had been done, and in 2009, we're proposing money in the Innovations to Existing Plants but that again is focused on the carbon capture piece of it and it's capturing carbon from the existing coal fleet, is where that line is moving to.

So, we are—in the past, we have done work on mercury, but now we're moving more toward carbon capture.

Senator ALLARD. Now, what I'm hearing on this carbon capture, some of this you're talking about disposing of the carbon in one way or another.

Just sitting here listening to your discussion, I know that we make carbon compounds that are very light and extremely strong. Is there a possibility of taking those carbon compounds that you have left over from your coal utilization, and converting those into a commercial product like these carbon compounds where they're extremely light and extremely hard? And they're actually using them. Taking these synthetics and actually making them part of the fuselage of planes and whatnot because of their lightness and durability. Is there anything being done on that?

Mr. SLUTZ. I think there's been past work being done on other ways to store it, other than sequestration, but right now, we're focused on sequestration. And I'll tell you part of the challenge——

Senator ALLARD. Is there a future in that?

Mr. SLUTZ. Well, part of the challenge is the scale. And if I could just give you a sense of that——

Senator ALLARD. If you would.

Mr. SLUTZ. If you captured all the carbon from all the power—the coal-burning powerplants in the United States and then you compressed it so it was a liquid, like it was, it's called super-critical, so it's like a liquid. You would have to manage 50 million barrels a day of that liquid. That's 2½ times our current oil-handling capability.

So, from a scale—it's not that I'm not saying it doesn't—I don't know the answer to whether it does and we can look into that from a standpoint of giving a technical answer of the possibility of that, but the part of the challenge is the amount of carbon dioxide we could deal with.

Senator ALLARD. Well, I see that, is this liquid carbon dioxide or is this——

Mr. SLUTZ. When you move it, you compress it.

Senator ALLARD. Is this frozen carbon dioxide what you're dealing with in the end?

Mr. SLUTZ. No, it's actually—carbon dioxide is a gas when you compress it.

Senator ALLARD. Right. And then it——

Mr. SLUTZ. And then it becomes like a liquid.

Senator ALLARD [continuing]. Becomes a liquid and then a solid.

Mr. SLUTZ. Yes.

Senator ALLARD. Yes. But when you—carbon sequestration. I mean, if you take the oxygen out, you've got carbon?

Mr. SLUTZ. Right. But CO_2 is you inject it for sequestration.

Senator ALLARD. Okay, all right. So, you inject the CO_2 for sequestration. My point is there a carbon compound that's left over in the process?

Mr. SLUTZ. In——

Senator ALLARD. Not really?

Mr. SLUTZ. Not really.

Senator ALLARD. Not really. So, when we combine this with soda, soda ash, for example, what is happening? I mean, why are we combining it with soda ash? Is this a way of disposing of the carbon, CO_2?

Mr. SLUTZ. I would have to get back with you on that. I'm not sure of the answer to that question.

Senator ALLARD. I'm trying to get an understanding here of the disposal cycle as we go through the sequestration.

Mr. SLUTZ. Oh, sequestration. You're actually inject—what you're doing is you're injecting the CO_2 into a deep underground saline aquifer, so it stays in that—because of the geologic pressure, it stays in that super-critical liquid.

Senator ALLARD. CO_2.

Mr. SLUTZ. CO_2, yes.

Senator ALLARD. Okay.

Mr. SLUTZ. Now——

Senator ALLARD. No attempt has been made to take these by-products and put them to a useful purpose, is what I'm trying to get to.

Mr. SLUTZ. In the past, I think there's been some limited work in that.

Senator ALLARD. Yes. But do you think that there—we should be doing something like that?

Mr. SLUTZ. I don't know what the—I'm not sure what the potential is on that.

Senator ALLARD. I think we ought to look at that. I mean, we always have a disposal problem, but we need to look at, you know, how you recycle this stuff, and if there's the technology there to put it to some useful purpose, I think we ought to look at that.

Mr. SLUTZ. There is one area that we see a significant—it's still not done on a full scale, but using CO_2 for enhanced oil recovery is one very likely possibility and an early possibility for finding an alternate use for CO_2. As it's injected into the oil reservoir, it increases oil production. It's done—there are some—at Permian Base in west Texas, significant enhanced oil recovery is done by using CO_2. So, yes, that's probably one of the largest reuse opportunities in enhanced oil recovery.

Senator ALLARD. I see my time has expired. Thank you.

Senator DOMENICI. Excuse me, Mr. Chairman. Might I comment?

Senator DORGAN. Senator Domenici?

Senator DOMENICI. I might say Senator and Mr. Secretary, this injection that you speak of has been done for—that's a pretty old use of carbon dioxide, and it was not done for the purpose of leaving CO_2 underground. Nobody was trying to remove CO_2. We didn't know it was a problem. It was a good way to fill the underground veins of oil and push the oil up. So, we find out now that maybe that's a way to get CO_2 out of circulation, and it does quite well.

I might say to the Senator, one of the most interesting things happened in testimony yesterday from Mr. Caruso from the Energy Information Agency. When we passed the CAFE standard for automobiles, Mr. Caruso just told us yesterday how much carbon dioxide we saved, will save by 2030 because of the forced change in the size of automobiles and et cetera.

We're going to save 5 billion tons just by that law and its implementation among the car owners of America. So, we're not going to get rid of carbon dioxide only by——

Senator ALLARD. Well, you need to have CO_2 if you're going to have plant life on this world.

Senator DOMENICI. Yes. But what I'm saying is there's lots of ways we're going to reduce it. That's one. We didn't even have to do anything except pass a bill to change the model of cars and you cut 5 billion tons in that.

I've told the chairman that I had to leave, Secretaries, and I want to thank all of you and especially you, Mr. Spurgeon. We'll be working hard with you for the next 10 months to see that we can come up with some more good things before you leave.

Thank you, Mr. Chairman.

ADDITIONAL COMMITTEE QUESTIONS

Senator DORGAN. Senator Domenici, thank you very much. At this time I would ask the committee members to please submit any additional questions they have for the witnesses for the record.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED TO HON. DENNIS R. SPURGEON

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

Question. The difference between the Department's fiscal year 2008 request and fiscal year 2009 request for the Advanced Fuel Cycle Initiative (formerly GNEP) is down roughly $100 million. Clearly this will result in significant change in the research objectives of this program. Can you please explain to the subcommittee how the Department has modified the scope of this program and what are the near term technology goals for this program?

Answer. The reduced funding between the fiscal year 2008 budget and fiscal year 2009 budget for AFCI, which is the domestic technology research and development component of GNEP, results from, among other considerations, a planned reduction in R&D resulting from industry feedback to date showing that prior R&D scope might be greater than required to meet industry needs. In fiscal year 2008 the Department solicited input from industry to determine whether the near-term technology and deployment goals of GNEP could be met using commercially available technologies. This interaction indicated that the initial deployment of spent nuclear fuel recycling technologies could utilize technologies already in use on an industrial

scale in Europe and Asia, with modifications to ensure pure plutonium is not separated.

Question. The fiscal year 2008 Energy and Water bill directed the Department to develop a strategy to address the spent fuel inventories at the closed civilian nuclear facilities in New England and the West Coast. These sites, which have no ongoing nuclear operations, are simply long term storage facilities for spent nuclear fuel. What is the Department doing to implement this Congressional direction and what are the options currently under consideration?

Answer. The fiscal year 2008 Report language requested the Department of Energy (DOE) develop a plan for accepting spent nuclear fuel currently stored at decommissioned reactors at either an existing Federal site, at one or more existing reactor sites, or at a competitively-selected interim storage site (including those sites that volunteered to host Global Nuclear Energy Partnership facilities). The Department is currently evaluating pertinent information and preparing a report in response to this request.

Question. As I noted in my opening remarks, the MOX fuel fabrication facility has not received adequate funding and the Department will be forced to rebaseline the program to establish a new budget and schedule for this project. Can you please inform the subcommittee of the impacts of Congressional cuts to the MOX program and how much taxpayers will pay as result of these cuts? What will this do in terms of delaying our goal of eliminating excess plutonium from the U.S. weapons stockpile?

Answer. DOE is currently analyzing the MOX cost and schedule impacts that will result from the $217 million funding reduction to the MOX project (this reduction includes $100 million cut from the budget request, the rescission of $115 million and a $2 million reduction in Other Project Costs) in the 2008 Consolidated Appropriations Act. It is premature to speculate on the impacts of these changes until this analysis is completed. However, we expect that the funding reductions could increase the total project cost of the currently validated baseline for the MOX facility, delay the facility construction and operations schedule, and ultimately, delay our goal of eliminating plutonium that has been declared excess to U.S. defense needs.

Question. Last year, as part of the Energy and Water bill, Congress directed the Department to make investments in our national labs instead of pursuing a brand new consolidated fuel technology center. The labs support a wide variety of nuclear research ranging from nuclear weapons to medical isotopes, but the infrastructure at these facilities are aging and require new investments to sustain the scientific capability. Do you agree that we need to continue to invest in our scientific infrastructure and how does the fiscal year 2009 budget request support this goal?

Answer. The Department of Energy (DOE) strongly believes that investment in our scientific infrastructure is critical to successful accomplishment of our mission. The fiscal year 2009 budget supports this goal, and DOE will continue to support and maintain our facilities and equipment so that research and development (R&D) of nuclear energy technology can be conducted with the best available laboratory assets.

DOE is actively reviewing existing facilities to determine how they can be used in the near term to develop and demonstrate the technologies we envision for the Global Nuclear Energy Partnership (GNEP) such as advanced fuel separations, transmutation fuel fabrication, improved waste forms, and integrated safeguards. Potential new GNEP facilities are being evaluated to inform policy decisions and understand the environmental impacts associated with them. It is important to have facilities that can perform integrated testing at an engineering scale to enable the United States to become a leader in advanced fuel cycle R&D.

The fiscal year 2009 budget request supports funding for establishment of the Materials Test Station (MTS) at the Los Alamos Neutron Science Center (LANSCE). This work, conducted in parallel with NNSA's LANSCE-Refurbishment, will establish an advanced-fast-reactor-fuel test capability in a currently unused target station at LANSCE. The budget request also supports infrastructure investment at the Idaho National Laboratory, DOE's lead laboratory for nuclear energy R&D. It also supports the continuation of an effort initiated this year to characterize the full compliment of nuclear facilities and capabilities that will provide data to inform future decision making. One goal of this effort is to help assure needed nuclear facilities are maintained without regard for their location or ownership. This is an ambitious undertaking, but I feel it is critically important to understand our infrastructure requirements and to target future investments according to a well-researched plan.

Question. NRC Licensing of New Nuclear Plants.—It seems to me that the most successful NE program has been the NP 2010 program, which is a joint DOE/Industry cost share program to design and prepare a standard license for NRC review. It occurs to me that many of the new facilities being supported by DOE research

such as the Next Generation Nuclear Power Plant and the spent fuel recycling facilities must at some point address the NRC licensing requirements and safety standards. What is your office doing to respond to the inevitable NRC licensing requirements for these facilities?

Answer. The Energy Policy Act of 2005 (EPAct), requires the Secretary of Energy and the Chairman of the U.S. Nuclear Regulatory Commission (NRC) to jointly submit to Congress a licensing strategy for the Next Generation Nuclear Plant (NGNP), by August 8, 2008. EPAct also directs the U.S. Department of Energy (DOE) to develop the NGNP prototype for commercialization and directs NRC to license the prototype. DOE and NRC staff have worked closely together to jointly develop a comprehensive strategy for licensing the NGNP. This report was completed and submitted on August 13, 2008. This strategy identifies NRC policies considerations, procedures, analytical tools, and methods expected to be needed to establish a gas reactor safety review infrastructure.

DOE envisions that spent fuel recycling facilities will be designed, constructed, and operated by commercial entities under NRC regulation. In July 2007, DOE established a Memorandum of Understanding (MOU) with NRC that provides for increased cooperation between DOE and NRC to allow NRC staff to become more educated on technologies and engineering aspects of potential nuclear fuel recycling facilities. NRC is participating in meetings, observing testing, touring DOE facilities, and reviewing industry deliverables provided to DOE. NRC staff members are considering regulatory framework issues associated with licensing and regulating a nuclear fuel recycling facility.

Question. Later today, the Energy Committee will receive testimony on the status of the domestic nuclear fuel cycle and how various trade agreements and the "Eurodif" decision will impact the our domestic energy security. (I am sure you are fully aware that the United States is over 80 percent dependent on foreign uranium enrichment today.) Do you have any concerns about the viability of a domestic mining, enrichment and conversion industry to keep pace with expected growth in nuclear plants?

Answer. The Department of Energy (DOE) agrees that the United States is very dependent on foreign sources of uranium, conversion, and enrichment to meet its domestic nuclear fuel needs. Over the past several years, DOE has observed encouraging signs that higher prices for uranium have spurred interest in domestic uranium exploration which will lead to increased uranium production, that the U.S. conversion industry is increasing its annual output, and that the United States will increase its domestic uranium enrichment capacity. Louisiana Energy Services and USEC Inc. have received licenses from the Nuclear Regulatory Commission to build and operate new enrichment plants in the United States. AREVA NC and GE Hitachi have also announced plans to build new enrichment plants in the United States. The Department is working with these private enrichers by assisting these companies in complying with U.S. laws and regulations regarding the protection of proliferation-sensitive enrichment technology. Additionally, the fiscal year 2008 appropriations legislation authorizes DOE to issue up to $2 billion in loan guarantees for advanced nuclear facilities for the "front-end" of the nuclear fuel cycle.

Question. Based on the trade history of the Russian Government do you have any concerns regarding the ability of U.S. nuclear fuel industry to be competitive with their Russian counterparts?

Answer. The U.S. enrichment industry is in a transitional phase and is beginning to plan and construct newer, more efficient enrichment plants. The Department of Energy (DOE) is concerned that unlimited sales of foreign enrichment at less than fair value prices in the United States could pose a threat to the viability of plans for constructing and expanding modern enrichment technologies in the United States. DOE is currently working with other U.S. departments and agencies on a number of options to address this issue.

On December 21, 2007, DOE, the Departments of State, Commerce, and Defense jointly sent a letter to Senators McConnell and Bunning and Representative Whitfield expressing the administration's views regarding H.R. 4929 and a companion bill S. 2531 that would amend the Tariff Act of 1930 to make clear that all imports of low enriched uranium (LEU) are subject to coverage under the antidumping law without regard to the nature of the transactions pursuant to which LEU is imported.

Question. USEC recently announced that the cost of the American Centrifuge Plant is going to increase from $2 billion to $3.5 billion. This plant is being counted on to replace the existing gaseous diffusion plant and provide a much needed source of domestic uranium enrichment. This technology was provided to USEC by the U.S. Government at no cost. Can you tell me what the state of this project is and whether or not you believe this facility will be commercially viable?

Answer. While the Department of Energy (DOE) granted USEC, Inc. (USEC) a nonexclusive patent license to DOE-developed centrifuge technology at no initial cost in 2006, the license contains substantial royalty payments once commercialization at USEC's American Centrifuge Plant (ACP) is at a certain level, with royalty payments capped at $100 million. It should be noted that the cost of developing and deploying centrifuge technology and constructing the ACP is being borne by USEC, and not the Federal Government. The Government provided access to USEC to the existing centrifuge facilities at Portsmouth for the purpose of deployment of advanced enrichment technology in a commercial plant under a lease amendment, executed in 2006. USEC has spent an estimated $540 million of its own funds to advance the centrifuge technology, a highly classified technology the Government still owns. In the next year, USEC plans to spend an additional $1 billion on research, deployment, and construction of the ACP. These funds have in part been used to support research into centrifuge technology by the Oak Ridge National Laboratory (ORNL) and to upgrade and modernize DOE-owned centrifuge facilities at the former Gaseous Diffusion Plants (GDPs) in Portsmouth, Ohio, and Oak Ridge, Tennessee under a Cooperative Research and Develop Agreement (CRADA) executed in 2002. Under the CRADA, USEC retains rights to inventions USEC makes during the work; however, the Government retains a license for Government use and a right to negotiate for commercial rights. Any inventions made by ORNL employees under the CRADA work are owned by DOE.

Retaining the domestic capability to enrich uranium is vital to the Nation's energy security and national security. USEC has demonstrated in a lead test cascade that the American Centrifuge is capable of producing the level of enrichment required by its customers and has increased machine performance beyond initial objectives. These developments suggest that USEC has advanced the American Centrifuge sufficiently to build and operate a commercially viable full-scale enrichment production facility. DOE's Office of Nuclear Energy continues to closely monitor the progress of development and deployment of the American Centrifuge and to assure that the Department's rights and options are protected.

Question. What will happen to this Government technology if USEC fails to commercialize the project technology?

Answer. A number of actions are possible. As noted above, the technology license is nonexclusive. If USEC fails to commercialize the technology, the technology will remain available for license to another entity by DOE. Additionally, under the 2006 lease of the gas centrifuge facilities at Portsmouth with DOE, the lease can be terminated and rights to USEC's background technology and new technology can be assumed by the Government should certain commercialization failures occur. Similar provisions regarding the assumption of technology are contained in a DOE–USEC 2002 Memorandum of Understanding.

Question. Your office has been working on a strategy to sell excess uranium inventories, the largest amount of material contained in the depleted uranium tails still stored at Paducah and Portsmouth enrichment facilities. I understand that the plan will propose to sell up to 10 percent of total annual market to avoid undermining the market prices. When will this plan be available for review and what does the Department propose to do with the proceeds of these sales?

Answer. The Secretary of Energy recently released a Policy Statement on the Management of the Department of Energy's (DOE) Excess Uranium Inventory. This statement provides the framework within which DOE will make decisions concerning future use and disposition of its inventory. During the coming year, DOE will continue its ongoing program for down-blending excess highly enriched uranium into low enriched uranium (LEU), evaluate the benefits of enriching a portion of its excess natural uranium into LEU, and complete an analysis on enriching and/or selling some of its excess depleted uranium. Specific transactions are expected to flow from these analyses.

As stated in the Policy Statement on Management of the Department's Excess Uranium Inventory, in the absence of otherwise applicable statutory authority, the Department currently may not retain any money it receives from the sale of uranium and use that money for Departmental programs, but rather must treat any such proceeds as receipts subject to the Miscellaneous Receipts Act.

Question. Mr. Spurgeon, your budget proposes to spend $20 million this year and $100 million over the next 5 years to develop "grid appropriate reactors". It is my understanding that these small reactors are intended to be sent to countries with "limited nuclear experience" (fiscal year 2009 budget justification). Everything I have learned about nuclear power over my 36 years in the Senate is that economies of scale are critical to making these zero-emission facilities economic. Before the Department commits $100 million of taxpayer resources, I would be very interested in your explanation of the business case for this project.

Answer. Economy of scale (EOS) is an important factor when optimizing the cost of electricity from any power source, but it is not the only factor to consider in a decision to deploy nuclear power. More than half of the developing countries interested in pursuing nuclear power have physical and/or financial constraints that preclude them from considering large plants. Factors such as grid capacity and stability, availability of investment capital, and concerns for total project risk will likely limit these countries to consider plants with electrical capacities less than 500–600 MW and total construction cost less than $1 billion. Because the cost of power from alternative energy sources in many of these countries is 5–10 times higher than for the United States, the modest EOS penalty on the cost of electricity from a smaller-sized nuclear power plant is of less concern than the total project cost.

Detailed analyses by the IAEA have shown that the EOS penalty can be reduced (by about 85–90 percent from a large reactor) by several other factors associated with smaller plants, including: common systems shared among a group of reactors; more rapid "learning" during fabrication; phased construction of multiple small units, allowing revenues from initial plants to offset capital outlays of follow-on plants; reduced interest costs due to shorter construction times and lower capital outlays; economic efficiencies gained by better matching of the energy supply and demand rates; and simplifications in the plant design enabled by their smaller size. Given all these factors, it is likely a small reactor will be extremely competitive with other energy forms in the local economy of a developing country.

The introduction of nuclear energy brings other benefits that favor its introduction even if economics favor a less expensive alternative. The need to be technically competent to safely regulate and operate nuclear technology requires a significant amount of infrastructure development that will enable significant spin-off benefits. For example, once a competent nuclear regulator and radiation protections are in place, the country can pursue nuclear medicine. Once nuclear certified welders, electricians and mechanics are available, they can also fill other skilled occupations. Engineering and science based academic curricula will produce technical talent for other sectors in the economy. In short, introduction of nuclear energy will act as a fulcrum to raise the technological competence of an entire nation, with substantial benefits. For example, the Republic of Korea's first reactor was purchased as a turnkey project from Westinghouse. An element of the deal was training the welders to perform portions of the construction. After completion of the reactor these highly-trained, skilled welders became available to expand ROK's shipbuilding industry, which is now a world leader.

Question. On Saturday, the Washington Post reported that the United States and Russia have initialed but not signed a "123 Agreement" on nuclear cooperation. However, without final signatures and Senate approval, there are limits on our ability too cooperate with Russia on civilian nuclear research and trade. Can you explain how this will impact your GNEP program?

Answer. Work with Russia under the Global Nuclear Energy Partnership (GNEP) has not been impacted by the lack of a 123 Agreement with Russia. We continue to interface with Russia on issues concerning GNEP. However, without a 123 Agreement, GNEP research and development (R&D) collaboration with Russia will be delayed. This will limit our access to Russia's experience and facilities, both of which could reduce the cost and time to develop the technologies required to close the fuel cycle. GNEP could develop the technologies without the assistance of Russia or other international partners, but the time, effort, and cost will be greater.

Integration of foreign experience into the U.S. advanced fuel cycle R&D program significantly declined in the 1980s and 1990s, which accelerated our loss of expertise and nuclear infrastructure. The United States now lacks many of the facilities needed for GNEP. We have no commercial-scale separations plant, no engineering-scale separations or transmutation fuel fabrication capability, no operating sodium fast reactor, etc. Meanwhile, Russia, France, Japan, and others have made significant progress in developing technology and related infrastructure. Collaboration with GNEP R&D partners is necessary, at least until the United States has rebuilt the required domestic infrastructure. Collaboration with Russia will give the United States access to a significant number of research laboratories that have relevant expertise. During the last 9 years, we gained significant access to Russian experts and facilities, allowing us to rebuild our capabilities by integrating their most recent results.

Question. Will the lack of an agreement limit U.S. commercial entities from selling natural uranium or fuel services to Russia?

Answer. Section 123 Agreements for Cooperation act in conjunction with other nonproliferation tools, particularly the Non-Proliferation Treaty, to establish the legal framework for significant nuclear cooperation with other countries. While the lack of such an agreement will prevent the United States from exporting natural

uranium to Russia, a wide range of cooperative activities with Russia may still go forward. The United States and Russia drafted a report, entitled Joint Working Group on the Development of a Bilateral Action Plan to Enhance Global and Bilateral Nuclear Energy Cooperation that details principal areas of cooperation as well as short-term cooperative focus areas. The report establishes measures that will promote sustainable and safe nuclear energy use and expansion, in the United States, Russian Federation, and worldwide while strengthening nuclear nonproliferation and effectively addressing waste management. Specifically, it outlines national strategies in nuclear power; identifies the common bases for U.S.-Russian cooperation in advanced reactors, exportable small and medium reactors, nuclear fuel cycle technologies, and nonproliferation; and defines a plan for cooperation.

Question. In the fiscal year 2006 Energy and Water bill, Congress provided $20 million and directed the Department to work with interested communities to support site development plans for a recycling plant, advanced fuel fabrication facility and an advanced reactor. What is the status of this effort and what is the Department doing to support these sites and provide technical support? What is the status of the Programmatic Environmental Impact Statement? What are the next steps for these communities?

Answer. The Site Characterization Reports conducted by 11 commercial and public consortia are the product of the $10,458,242 in grant awards made on January 30, 2007. Recipients had 90-days to complete these studies and submitted the reports to DOE on May 1, 2007. Information generated from these reports, coupled with existing site information, provide a variety of data relating to both DOE and non-DOE sites, including: site and nearby land uses; demographics; ecological and habitat assessment; threatened or endangered species; historical, archaeological and cultural resources; geology and seismology; weather and climate; and regulatory and permitting requirements. The Site Characterization Reports were made available to the public, and reviewed by DOE as part of the National Environmental Policy Act (NEPA) process and used in preparing the draft Programmatic Environmental Impact Statement (PEIS). DOE met with the associated communities last fall to identify key community issues related to GNEP that included the need to educate the public about the program.

The Department received more than 14,000 comment documents during the scoping period for the GNEP PEIS. Evaluation of these comments resulted in consideration of several alternative nuclear fuel cycles and technologies.

DOE is working to clarify the impact of GNEP technical and policy decisions on the local communities. Communications with potentially affected communities will continue throughout the NEPA process.

Question. The Department has significantly increased its support for this program. While the two reference reactor designs continue to develop better fidelity in the project details, costs continue to increase and reactor vendors are now concerned that the original agreement to cost share $1.1 billion will not be sufficient to provide the total cost for the Standard Design. What are the Department's plans to address the potential shortfall?

Answer. The fiscal year 2009 congressional budget request is based on an increase in the licensing demonstration project from an initial total estimate of $1.1 billion to $1.45 billion ($727 million in Federal cost share). This increase is required to address increases in regulatory related costs and design standardization costs.

The Department of Energy's (DOE) cost share primarily supports the development and implementation of the "untested" regulatory process for the combined Construction and Operating License (COL) applications for two new nuclear plants. Since the 2005 Baseline estimates were prepared, Nuclear Power 2010 (NP 2010) has evolved from a "demonstration" program to become the centerpiece of two Design Centered Working Groups (DCWG) on which COL applications for 10 or more plants (most are twin units) depend for success. It also supports the completion of the first-of-a-kind engineering for two reactor designs. The designs must have sufficient engineering design details to provide power companies reliable cost and schedule information they need to make plant orders. A number of the utilities participating in NP 2010 also need this information to support regulatory approvals at the State level via their Public Utility Commissions (PUC).

Additional funding related to increases in regulatory-related costs primarily supports the evolving Nuclear Regulatory Commission (NRC) licensing process (significant revisions to NRC rules/requirements, responses to NRC requests for information, etc.) and escalating NRC review fees. Additional funding related to increased standardization supports the industry's effort to extend the level of design detail required for increased standardization for procurement, operation, and maintenance of the plants. This level of design detail would provide specifications of equipment and components. DOE believes this degree of standardization is critical to ensuring

the past inefficiencies of our existing commercial nuclear fleet are not repeated. Without additional funding, there is a high risk that the aggressive operational dates (approximately 2015) for the first units of the two standard designs may not be met.

QUESTIONS SUBMITTED TO HON. KEVIN M. KOLEVAR

QUESTION SUBMITTED BY SENATOR BYRON L. DORGAN

Question. I am pleased that the President has proposed to double the Energy Storage and Power Electronics account in your budget. It still seems to me that this number ($13.4 million) is far too low to adequately address our needs to develop commercial scale energy storage capabilities which are critical to placing renewable energy onto the grid. Do you believe that $13 million is enough to allow you to accomplish what needs to be done in this area? What other technical challenges would your office focus on with additional funding, and how would these technologies facilitate integration of renewable energy onto the grid?

Answer. The President's budget request of $13.4 million for the Office of Electricity Delivery and Energy Reliability adequately funds Energy Storage and Power Electronics to further storage technology as an important component of the modern electrical grid. The request focuses on critical areas of concern. The fiscal year 2009 Congressional request will continue to demonstrate utility scale storage technologies (cost-shared, pre-commercial projects) and initiate a partnership with the Office of Science specifically investigating the use of nano-materials for advanced storage electrodes and new high voltage electrolytes.

Additional technical challenges include developing new storage technologies with improved cost effectiveness, safety, and reliability. Applied research would include new engineered materials and ionic liquids to increase energy density of storage systems. Additional systems research would focus on scaling up existing technologies into megawatt devices suitable for grid applications. Energy storage systems will advance the penetration of renewables by helping to eliminate integration concerns such as short term variations and ramping problems, and allow energy management by dispatching renewable energy.

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

Question. Part of DOE's mission is to promote America's energy security through reliable, clean and affordable energy. I understand that EPA plans to propose a revised rule before the end of the year governing cooling water intake structures at existing power plants as a result of a recent 2nd Circuit Court decision. The central question before the agency is what should be deemed the best technology available (BTA) to minimize the adverse environmental impacts that might result from cooling water intake structures. The Court has directed the agency to clarify why cooling towers or their performance equivalent, were not deemed BTA. I understand that approximately 40 percent of the Nation's existing generation will be directly and materially affected by this rulemaking. Has DOE examined the short and long term energy reliability and security impacts of designating cooling towers as BTA for existing generation facilities and does DOE believe they would be significant?

Answer. The Department has not prepared a study on the specific issue of electricity reliability impacts of a cooling tower mandate, but has studied the energy penalties that would occur if existing steam generators were required to replace existing "once-through" cooling systems with recirculating cooling tower systems. This October 2002 report is titled the Energy Penalty Analysis of Possible Cooling Water Intake Structure Requirements on Existing Coal-Fired Power Plants (see attached). The Department agrees that a new Clean Water Act rule requiring cooling towers for existing steam generation units could have implications on the adequacy and reliability of electricity supplies in the near and mid-term. Moreover, the effect of such a rule could be significant if combined with other retrofit mandates that may be required of existing generators under, for example, the Clean Air Act. The Department participated in an interagency review of EPA's original rule under E.O. 12866 and will do so again when the new rule is submitted to the Office of Management and Budget for review.

Question. Could DOE do an analysis of the potential impacts for this committee, including the impacts on electricity reliability on a regional basis, and provide preliminary results as early as May so that these results could be meaningfully considered in the EPA rulemaking?

Answer. DOE will prepare an expedited analysis of the potential impacts of a "cooling tower" rule on electricity supply and reliability in order to provide the committee with preliminary results. In addition, the Office of Electricity Delivery and Energy Reliability will conduct a more thorough analysis of the issues facing the existing steam generation fleet, with a goal of completing that study in the fall of this year. We have asked EPA and the Federal Energy Regulatory Commission to cooperate with the Department on these studies, particularly with respect to the electricity reliability analysis.

QUESTIONS SUBMITTED TO JAMES SLUTZ

QUESTIONS SUBMITTED BY SENATOR BYRON L. DORGAN

Question. We see news around the country about proposed coal-fueled power plants being canceled or postponed almost every week due to rising construction costs, the uncertainty of future regulations on carbon emissions, and much more. The Office of Fossil Energy has a longstanding relationship of working with industry in the various clean coal programs. The next round for the Clean Coal Power Initiative (CCPI) is slated to focus on carbon capture and storage and other beneficial uses of CO_2. What do you propose to do to get new coal plants built so we can continue to utilize our abundant domestic coal resources?

Answer. The Department of Energy's Clean Coal efforts begin with Research and Development (R&D) to advance technologies serving as building blocks for affordable, near-zero atmospheric emissions coal plants. These technologies, such as advanced turbines, gasifiers, fuel cells, and carbon capture and storage technologies are then integrated and demonstrated at commercial scale through the Clean Coal Power Initiative (CCPI). In parallel to CCPI, large volume carbon sequestration tests will demonstrate the technical viability of geologic CO_2 injection at commercial scale. FutureGen is restructured to focus on accelerating the commercial experience with the integration of carbon capture into advanced plants including Integrated Gasification Combined Cycle (IGCC). These early commercial demonstrations will help accelerate deployment of carbon capture and storage by addressing technical, siting, permitting and regulatory issues. Loan Guarantees and Tax Credits may help accelerate commercial deployment of advanced technologies through financial incentives and mitigation of some risk.

Question. When will the Department release the CCPI Round III Solicitation? Is the redirection of the FutureGen program hindering the release?

Answer. The CCPI Round III Draft Funding Opportunity Announcement (FOA) was released on October 3, 2007. The redirection of the FutureGen program did not hinder its release. A Public Workshop was held on November 1, 2007, to answer questions and receive public input on the Draft FOA. The public comment period was held open until November 23, 2007. The Department is currently revising the FOA based on public input to ensure that it is best suited to meet the needs of both the public and the Department. The Department is planning to release the Announcement this fiscal year, with project selections taking place in fiscal year 2009.

Question. How much does the Department believe will be available for this next solicitation?

Answer. The Department currently expects to have $224 million available for CCPI Round III, which includes an anticipated $85 million in fiscal year 2009 funding.

Question. In the Clean Coal Power Initiative Rounds I and II, in 2003 and 2004 respectively, the Department made more than $300 million available. Is the Department still planning to go ahead even though this $300 million threshold may not be met?

Answer. Yes, the Department plans to issue the CCPI Round III in fiscal year 2008. The Department has received a significant amount of interest from industry in CCPI Round III. Over 80 participants from industry attended the CCPI Round III Public Workshop, and they identified numerous projects that will be seeking to participate in CCPI Round III. The Department believes that meaningful projects can be selected. Delays of an additional 6 to 9 months would be required to wait for fiscal year 2010 funds to become available.

Question. Why is the Department planning on combining the funding for the CCPI and FutureGen programs (as indicated in the fiscal year 2009 budget request) and how does the Department propose to go forward with both?

Answer. In the fiscal year 2009 budget request, funding for the CCPI and FutureGen programs has been requested as separate line items. The Department plans to move forward with both CCPI and FutureGen by issuing a separate Fund-

ing Opportunity Announcement (FOA) for each program. Each FOA will outline the specific requirements of each program, allowing potential applicants to determine which program is the best fit for their technology and business model.

Question. The carbon sequestration program has grown significantly in the last few years and the regional partnership program has been well received by many stakeholders. Four of the seven Regional Carbon Sequestration Partnerships have been funded to conduct large-scale demonstrations. The Departments budget request for fiscal year 2009 is $149 million. Does the Department plan to fund remaining three partnerships with this funding in the coming year? If not, why not?

Answer. DOE has made awards for five large-scale tests to four of the Regional Carbon Sequestration Partnerships (RCSP) for Phase III Large Volume Sequestration Testing. DOE is developing a peer-reviewed plan to be completed this spring that will identify the scientific and engineering test parameters to guide design and selection of large-scale tests. Items to be addressed include: rate of injection, duration of injection, and number and phasing of tests. The remaining proposed Phase III projects will be evaluated in the context of this plan. The evaluation process requires: (1) finalizing the technical scope of the projects by means of an independent study by an international group of experts; (2) undertaking a scientific evaluation; and (3) performing a cost analysis of the proposed projects to ensure the project costs are adequate prior to award. The estimated time frame for evaluating the remaining awards is the summer of fiscal year 2008.

Question. Are these funds sufficient enough to conduct the large scale carbon sequestration demonstrations in every region of this country to insure carbon sequestration is a valid option from coal-fired power plants and other facilities?

Answer. There are sufficient funds in the fiscal year 2009 budget request to conduct the pre-injection activities and initiate some preliminary injection activities for the large scale carbon storage demonstrations. These demonstrations will require funding beyond fiscal year 2009 for remaining CO_2 injection and post-injection monitoring activities.

Question. The administration has asked Congress for funding in fiscal year 2009 to expand the SPR to the 1.5 billion level. This will require a national commitment through 2029 to get to that level under the Bush administration's plan. Has the Department done an estimate of how much it would cost to construct the facilities and fill oil to the 1.5 billion barrel level?

Answer. The Department has not finalized its expansion plan, nor selected the sites for the expansion of the SPR from 1.0 billion to 1.5 billion barrels. DOE has requested $13.5 million in fiscal year 2009 to prepare its expansion plans and complete a NEPA environmental review. However, assuming the development of 2 additional new salt dome storage sites of 250 million barrels in the gulf coast, the total estimated construction cost for the expansion of the SPR from 1.0 billion to 1.5 billion barrels, is estimated in the order of $6.5 billion.

Question. What is the cost of developing the Richton, MS site and expanding the Bayou Choctaw, LA and Bill Hill, TX sites to reach the 1 billion barrel level?

Answer. The total estimated construction cost for the expansion of the SPR from its current capacity of 727 million barrels to 1 billion barrels, is estimated at $5.1 billion. This is based on conceptual design estimates which were prepared in 2006.

Question. How does the administration respond to its policy efforts to put the SPR fill on autopilot without consideration of cost and at the same time? Are there not better ways that we can invest our resources this year? Over time?

Answer. It is the policy of this administration to expand and fill the Strategic Petroleum Reserves in a manner that is both consistent and deliberate in order to maximize the energy security of the United States. The costs associated with this endeavor are important and they are carefully considered at every step.

Question. I have also noted that there is approximately $585 million in the SPR account from the sale of oil after Hurricane Katrina. Does the Department plan to issue more RIK contracts later this year or seek to directly purchase oil for the SPR with this $585 million regardless of the price of oil or offers made in a solicitation for direct purchase?

Answer. The fiscal year 2009 budget states "In fiscal year 2008 DOE will use available balances for the purchase of additional SPR oil, and will continue to fill using Federal royalty oil until 727 MMB is achieved in fiscal year 2009." The administration's objective is to complete the fill of the SPR to 727 million barrels before the end of calendar year 2008 by using the $584 million in available balances from the Hurricane Katrina oil sale for direct purchases and continuing the modest transfer of royalty oil from the Department of the Interior.

The Strategic Petroleum Reserve has undertaken a market analysis in accordance with the Procedures for the Acquisition of Petroleum for the Strategic Petroleum Re-

serve (10 CFR 626) to assure that the planned oil acquisition will not stress the market.

Question. The Energy Policy Act of 2005 provides guidance to expand the Strategic Petroleum Reserve (SPR) to the level of 1 billion barrels but only "without incurring excessive cost or appreciably affecting the price of petroleum products to consumers." The Department has said it conducts market analysis the impacts of filling the SPR and the price of petroleum and did so before the recent RIK contracts. Can you provide more detail about how the Department performs this analysis? Was the analysis peer-reviewed by the EIA, other agencies or independent experts? Is the analysis available to the public?

Answer. Prior to engaging in activities to acquire crude oil for the Strategic Petroleum Reserve, the Office of Petroleum Reserves conducts an assessment of market conditions to evaluate the potential for impacts on crude oil markets. A number of market indicators are examined in these assessments including stock levels, spot and futures prices, market fundaments, and energy security policy. The most recent market assessment was conducted in February 2008 and is currently being reviewed by Department officials and was informally peer reviewed by staff at the Energy Information Administration. However, EIA was not asked to comment on or evaluate the policy recommendations contained within the document. These assessments are not published on the internet, but they have been transmitted to the Congress.

Question. Does the Department believe there is a price threshold for not continuing the RIK transfer?

Answer. It is difficult to assign such a threshold without consider other contemporaneous market conditions. However, in the past the Department of Energy has suspended or delayed its fill activities in response to major petroleum market events and would do so again should the need arise. When acquiring petroleum, whether by purchase or royalty transfer, DOE will seek to balance the objectives of assuring adequate security and minimizing impact to the petroleum market. To this end, DOE will consider various factors that may be affecting market fundamentals and the geopolitical climate. DOE decisions on crude oil acquisition will take into consideration the current level of inventories, import dependency, the international and domestic production levels, oil acquisition by other stockpiling entities, the security value of additional storage, incipient disruptions of supply or refining capability, market volatility, the demand and supply elasticity, petroleum logistics, and any other considerations that may be pertinent. Monetary policy, the rate of economic growth, specific domestic market segments, and foreign policy considerations will also be evaluated. The timing of DOE entry into the market, its sustained presence, and the quantities sought will all be sensitive to these factors and their impact on U.S. energy security.

Question. Secretary Bodman stated to me and other Senators in a letter dated Jan. 8, 2008, that one of the reasons to increase the capacity of the SPR is that it only contains 57 days of import protection. However, Department's own website said that the United States has 118 days of public and private strategic stocks for import protection. The requirement to meet U.S. treaty obligations with the International Energy Agency (IEA) is for 90 days of import protection. Why is the Department telling U.S. policy makers that we need to fill the SPR for import protection and telling the international community that we are currently meeting our treaty obligations for import protection?

Answer. Under the Agreement on an International Energy Program (the Charter of the IEA), member countries are permitted to meet their required 90 day stockholding obligations through both public and private stocks. The United States currently relies on U.S. industry stocks to make up a significant portion (one-third) of its obligation.

Question. The fiscal year 2009 budget once again proposes to eliminate all oil and natural gas R&D programs. Ninety-four percent of this funding goes to small, independent producers that do not sufficient funding to conduct R&D of their own. The fiscal year 2009 budget request also proposes to eliminate $50 million in direct spending for ultra-deepwater offshore and unconventional onshore natural gas exploration technologies that would go largely to smaller independent oil and gas producers.

Small, independent, domestic producers and universities are the primary beneficiaries of Federal oil and gas R&D funding. Contrary to the administration's views, "Big Oil" does not have an interest in these programs. I am particularly concerned about the impacts of the cuts on the education of our next generation of energy professionals. Why is this administration being so shortsighted by decreasing funding to programs that are so vital to the Nation's future energy security and domestic energy production?

Answer. Oil and gas are mature industries and both have every incentive, particularly at today's prices, to enhance production and continue research and development of technologies on their own. There is no need for taxpayers to subsidize oil companies in these efforts. Although independent operators may not have the resources to fund technology development directly, the service industry that supplies them with equipment funds significant development of applicable technologies. The Department expects the service industry to continue to provide technological innovations for use by major and independent producers.

Question. Why is the administration turning its back on potential long-range solutions to declining domestic gas production?

Answer. DOE is supportive of efforts to increase the availability of domestic sources of natural gas. DOE supports the prompt construction of an Alaska natural gas transportation system to deliver gas from the North Slope of Alaska to the lower-48 States. Alaska's North Slope gas resources are estimated at 35 trillion cubic feet (TCF) discovered and 100 TCF potential. Industry has estimated the cost at more than $25 billion to build a 4.5 billion cubic feet per day (bcfd) pipeline with expansion capacity to 5.6 bcfd. To support such a project, the Department is authorized under section 116 of the Alaska Natural Gas Pipeline Act (ANGPA) to issue loan guarantees up to $18 billion, indexed for inflation according to the Consumer Price Index from October 13, 2004, to a qualified infrastructure project or, in the case of a qualified liquefied natural gas project, up to $2 billion of principal.

Question. A significant research project within the Natural Gas program is Methane Hydrates. If only 1 percent can be rendered economic, it would double the Nation's supply of natural gas. Why would the Department turn its back on this huge potential resource?

Answer. The administration does not support spending Department of Energy funds for research and development (R&D) on safety or production of methane hydrates, given the economic incentives industry has to pursue this R&D on its own. This is consistent with its position that oil and gas are mature industries and both have every incentive, particularly at today's prices, to enhance production and continue research and development of technologies on their own. There is no need for taxpayers to subsidize oil and gas companies in these efforts. However, several other Government agencies are supporting methane hydrate research where it fits their missions, including the U.S. Geological Survey (USGS), the Bureau of Land Management (BLM), and Minerals Management Service (MMS) within the Department of the Interior; the National Oceanic and Atmospheric Administration (NOAA); the National Science Foundation; and the Naval Research Laboratory.

Question. In the fiscal year 2008 Omnibus legislation, Congress requested that the Department begin the development of coal/biomass to liquids technologies with funding in the Fuels subaccount. Why is the Department's Coal Fuels request only focused on hydrogen from fossil fuels?

Answer. The Fossil Energy Coal Fuels Research Development and Demonstration (RD&D) Program was identified as a participant in the Hydrogen Fuel Initiative at the beginning of the Department's Hydrogen Program. Therefore, the focus on hydrogen from coal is the principal activity proposed in the Coal Fuels Program for fiscal year 2009, as the Coal-to-Liquid Fuels Technology Program had successfully achieved its RD&D goals for turning synthesis gas into liquid fuels, and these technologies can be commercialized by the private sector. The fiscal year 2009 budget includes development of technology for co-feeding and gasifying coal/biomass for electricity generation application. As with much of DOE's gasification program, DOE's fiscal year 2009 coal/biomass research targets electricity generation applications, but could also be used by the private sector for other applications, such as production of transportation fuels.

Question. Why does the Department not support this coal-biomass technology opportunity?

Answer. Consistent with the fiscal year 2008 appropriated funding, the Department has prepared, and will soon release, a Coal and Biomass to Liquid Fuels Funding Opportunity Announcement. This announcement will request applications for research and development proposals specifically limited to liquid hydrocarbon fuels from coal/biomass mixtures.

Coal-biomass to liquids technology involves two major steps: First, the coal-biomass feedstock must be turned into a synthesis gas. Second, the synthesis gas must be turned into liquid fuel. The first step, gasification of coal-biomass, is not mature and therefore continues to receive funding in the fiscal year 2009 budget. As with much of DOE's gasification program, DOE's fiscal year 2009 coal/biomass research targets electricity generation applications, but could also be used by the private sector for other applications, such as production of transportation fuels. The second step, turning synthesis gas into liquid fuel is mature and therefore is not supported

in the fiscal year 2009 budget. The Coal-to-Liquid Fuels Technology Program had successfully achieved its RD&D goals for turning synthesis gas into liquid fuels, and these technologies can be commercialized by the private sector.

Question. Congress also directed that the Department address energy/water technology issues in the fiscal year 2008 Omnibus legislation. This includes a research program to help develop tools that thermoelectric power plants can apply to better manage the critical link between water and fossil energy extraction and utilization is vital. The Department only supported CO_2 capture at existing facilities in its fiscal year 2009 budget request for the Innovations for Existing Plants program. Why does the Department not support the availability of funding for technologies to reduce water usage and consumption, while minimizing impacts on water quality?

Answer. Many of the technologies for reducing water use are mature and subject to incremental improvement that the private sector has the incentives and capability to undertake on its own. Improved water associated with transformational technologies is supported in the fiscal year 2009 budget request. Integrated Gasification Combined Cycle (IGCC) technology supported by the Gasification program uses significantly less water than the conventional Pulverized Coal (PC) technology. The focus of the Innovations for Existing Plants Program (IEP), will be on the continued research and development of advanced carbon capture technologies applicable to new and existing coal-fired power plants. The IEP program will develop technologies to separate and permanently store CO_2 that can be economically and effectively employed on pulverized coal power plants. As noted in the fiscal year 2009 budget request, the Department will also conduct research on optimizing power plant water use as it relates to CO_2 capture efficiency and optimization.

QUESTIONS SUBMITTED BY SENATOR PETE V. DOMENICI

Question. As I noted in my opening statement, the Department has shifted its strategy from a single 275 Megawatt facility toward multiple commercial demonstrations of carbon capture and sequestration applied to an IGCC facility. I am concerned that this strategy will take years to develop before we have any serious results from these demonstration efforts. What is the Department doing to accelerate this important research and what other near term efforts is the Department undertaking to support carbon capture and sequestration research?

Answer. Our commitments to the program goals of FutureGen are unchanged—to make near-zero atmospheric emission coal power plants a viable technology solution to address energy security and climate change concerns.

The Department is refocusing its investment on multiple, commercial demonstrations of Carbon Capture and Storage (CCS) technology integrated with Integrated Gasification Combined Cycle (IGCC) systems or other advanced technology coal power plants. The difference is that under the restructured program, our plan, with current cost estimates, is to support not just a single less-than-commercial-scale R&D testing laboratory, but rather to provide funding for commercial demonstration of integrated advanced carbon capture and storage technologies.

The restructured FutureGen will provide commercial data on cost, performance, and reliability. This information will help reduce risk of siting/permitting and operations for subsequent deployment, confirm economics associated with CCS, and facilitate industry-wide private capital offerings. It is expected that these commercial projects will be in operation in the next 6 to 8 years or possibly sooner depending on the sites selected.

The Department's fiscal year 2009 budget request proposes substantial increases for FutureGen, Clean Coal Power Initiative (CCPI) demonstration of CCS, and Carbon Sequestration. We have also increased overall R&D in the area of carbon capture and storage. For example, the fiscal year 2009 Sequestration Program budget was increased to $149 million with the bulk of this funding being used to support the field test program through the Carbon Sequestration Regional Partnerships—including five large-scale (Phase III) demonstrations of the feasibility of storing CO_2 in geological formations. The results of this research will be directly applicable to the capture and storage of CO_2 from advanced power systems such as IGCC and existing coal-fired power plants. Further, the Gasification Program fiscal year 2009 budget of $69 million will focus on continuing to increase the efficiency of IGCC while lowering costs. Research from both programs will advance the development and ultimate commercial deployment of IGCC with carbon capture and storage.

Question. I am pleased to see that the office of Fossil Energy remains committed to expanding the Strategic Petroleum Reserve to a 1 billion barrel capacity, as outlined in the Energy Policy Act of 2005. I have noticed in your budget that there is $13.5 million for planning purposes to expand past a one billion barrel capacity. In

these tight budgetary times, do you not believe that we should focus on reaching the one billion barrel capacity before we fund the planning of further expansion?

Answer. The expansion of the Strategic Petroleum Reserve to 1.5 billion barrels is essential to providing the United States with critical energy security. The Department has requested an initial $13.5 million to perform planning studies to determine the optimum configuration of the expansion beyond 1 billion barrels, and complete the environmental review process and site selection. Once the sites have been selected, the expansion project is expected to require in the range of 12 to 15 years to develop the additional 500 million barrels of storage capacity.

Question. The new CURC–EPRI roadmap, released in September 2006, defines the steps necessary to achieve near zero emissions from coal use, including the capture and sequestration of CO_2, and suggests that the investment necessary to achieve the goals of Roadmap is approximately $17.0 billion between now and 2025. In fiscal year 2008, we provided nearly half that amount through the DOE Loan Guarantee Program. Do you believe that the funds provided through the Loan Guarantee Program in fiscal year 2008 will get us half way to near zero emissions from coal use?

Answer. No, the Loan Guarantee Program, although an important incentive for deployment of new clean coal technologies, by itself is not expected to move the Nation half-way to near-zero atmospheric emissions for coal use. The CURC–EPRI roadmap, released in September 2006, proposes a funding level for a Research, Development, and Demonstration (RD&D) program focused solely on coal-based electricity generation. The loan guarantee program is intended to provide incentives for deployment of early commercial facilities, which would come online after successful commercial-scale demonstration. As stated in the program regulation, it isn't a research, development or deployment program. Though we expect there to be some synergy between early commercial projects and demonstration projects, by and large the Government spending proposed by CURC–EPRI is geared toward reducing the cost and improving the performance of the technologies. The Loan Guarantee Program will support commercialization of technologies that have already been successfully demonstrated.

QUESTIONS SUBMITTED BY SENATOR THAD COCHRAN

Question. What are the Department's goals in regards to Clean Coal and Carbon Capture? Request levels have varied dramatically in the last few years, but I'm pleased to see an increase in the program. Is the Department planning on researching coal-to-liquids technology?

Answer. The technology goal for the Carbon Capture and Sequestration Program is "to develop, by 2012, fossil energy conversion systems that offer 90 percent carbon dioxide capture with 99 percent storage permanence at less than a 10 percent increase in the cost of energy services."

With respect to researching coal-to-liquids technology, the Department is planning and will soon release a Coal and Biomass to Liquid Fuels Funding Opportunity Announcement. This announcement will request applications for research and development proposals specifically limited to liquid hydrocarbon fuels from coal/biomass mixtures.

Question. The Department of Energy has chosen a site in my State as the preferred location for expansion of the Strategic Petroleum Reserve, and funds were included last year for land acquisition. Mr. Slutz, can you speak about the time frame and future steps required for such expansion to occur?

Answer. It will take approximately 12 years to complete the site.

Project Steps and Schedule: Design and Land Acquisition—2008–2011; Facilities and Pipeline Construction—2010–2016; Cavern Development (Solution Mining)—2014–2018; Initial Oil Fill Capability—2016; Planned Site Completion—2019.

QUESTIONS SUBMITTED BY SENATOR WAYNE ALLARD

Question. I understand that the administration has decided to restructure their approach to FutureGen. Can you tell me more about that decision and the reasoning behind it?

Answer. The FutureGen project encountered significant cost increases, which raised the total estimated project cost from $950 million (in 2004 constant year dollars) to $1.757 billion (in 2007 as-spent dollars). Since the Department was responsible for 74 percent of the total project cost, DOE's projected investment had risen to approximately $1.3 billion. The Department was concerned over the prospect of further uncontrollable cost increases and attempted to limit its exposure to future

cost growth by engaging the Alliance in a series of discussions. After several months of negotiation with the Alliance, a mutually acceptable agreement with the Alliance could not be reached.

Therefore, a "restructuring" of the FutureGen initiative was pursued in order to maintain the Department's commitment to the administration's goal of developing a near-zero atmospheric emission power plant operating on coal. A Request for Information (RFI) was released on January 30, 2007, and the comments received from that RFI are now being reviewed and analyzed.

Rather than investing in the total cost of a single commercial-scale experimental facility integrated with carbon capture and storage, the restructured FutureGen approach will invest only in the carbon capture and storage portion of several commercial power projects. This will limit taxpayers' financial exposure to only help fund the carbon capture and storage portion of the plant. Furthermore, this new approach will allow us to accelerate nearer-term technology deployment in the marketplace faster than the timetable for the previous approach. In order to be successful in competitive power markets (and comply with the Department's competitive proposal evaluation process), the underlying power plant projects will still need to be efficient, competitive, and environmentally sound.

Question. What does this decision do to ensure that the results of the project are something that industry can pick-up and integrate into current or future facilities smoothly, especially with regard to high-altitude.

Answer. FutureGen will provide early carbon capture and storage (CCS) demonstration experience in a commercial setting, which is aimed at accelerating deployment and advancing carbon capture policy. The previous approach to FutureGen would have created a single "living laboratory" for research and development of advanced technologies, which may have needed significant testing before being considered to be "commercial" by industry.

The intent is to select multiple projects competitively and at full commercial size. The scale of these projects is in the range of 300 to 600 MW, with the demonstration portion involving CCS integration to be on one power unit (~300MW). Depending upon where the winning projects are located, this approach should yield more diverse information for future facilities than would a single FutureGen project in terms of coal types, regional geology, and altitude.

SUBCOMMITTEE RECESS

Senator DORGAN. Let me thank all three of the Secretaries who have joined us today, and I think this is a useful and important hearing to try to establish priorities and necessary funding requirements as we proceed with some very important programs at the Department of Energy.

This hearing is recessed.

[Whereupon, at 11:02 a.m., Wednesday, March 5, the subcommittee was recessed, to reconvene subject to the call of the Chair.]